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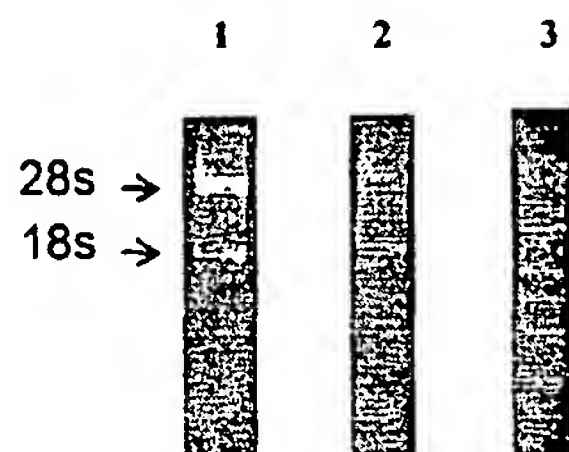
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(54) Title: POLYNUCLEOTIDES AND POLYPEPTIDES



Gel analysis of RNA isolated using the RNazol modified methodology.
(Lane:1 Eosinophils, Lane:2 Neutrophils, Lane:3 Molecular weight marker)

(57) Abstract: The present invention relates to polynu-
cleotide and polypeptide sequences which are associated
with eosinophil mediated inflammatory diseases, such as
asthma. The invention also relates to means and methods
for modulating the expression and/or activity of these
sequences, preferably in the treatment or prevention of
inflammatory disease mediated by eosinophils. Screening
assays for agents which act as agonists or antagonists of
these polynucleotides or polypeptides are also provided.

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POLYNUCLEOTIDES AND POLYPEPTIDES**FIELD OF THE INVENTION**

- 5 The present invention relates to polynucleotides and polypeptide sequences, and in particular relates to methods and means for the use of these polynucleotide and polypeptide sequences in the diagnosis, prevention and treatment of diseases mediated by eosinophils or other leukocytes, such as inflammatory disease.
- 10 The present invention also relates to the methods and means for modulating the expression and/or activity of such polynucleotides and polypeptides, and to agents which act as agonists or antagonists of these polynucleotides or polypeptides, and methods for identification of such agents.
- 15 The invention also provides oligonucleotide probes and primers, immunoassay kits and methods incorporating these polynucleotides.

BACKGROUND OF THE INVENTION

- 20 Inflammation is an essential protective process preserving the integrity of an organism against physical, chemical and infectious insults. The cellular basis of the inflammation is complex but is, in many cases, dependent on the biological activity of inflammatory leukocytes, including eosinophils [see Gleich G.J. and Adolphson C.R. (1986) The eosinophilic leukocyte, structure and function. Adv. Immunol. 39, 177-253; Giembycz M.A. & Lindsay M.A. (1999) Pharmacol. Rev.
- 25 51, 213-339], neutrophils, basophils, mast cells (granulocytes), Tand B -lymphocytes, monocytes and macrophages [see Asthma (1997) Lippencott-Raven, eds Barnes P.J., Grunstein M.M., Leff A.R. & Woolcock A.J.]. Where these cells migrate into the tissues, the key cell/cell interaction is with the vascular endothelium [see Prober J.S. & Cotran R.S. (1990) : The role of the endothelium in Inflammation, Transplantation 50, 537-544.] In many cases inappropriate
- 30 recruitment, proliferation, survival and/or activation of specific leukocytes within a particular organ or tissue will manifest itself as "disease", for example asthma or chronic bronchitis in the lungs, rheumatoid arthritis in the joints or inflammatory bowel disease in the gut. Co-ordination of the inflammatory process is complex and is dependent upon specific gene expression of proteins on the surface of cells to enable cell/cell contact [eg, vascular cell adhesion molecule -1
- 35 (VCAM-1) on endothelial cells interacts with the alpha -4 beta- 1 integrin (VLA4) on eosinophils], within the cell to enable intracellular signalling/activation, and within the cell to

produce inflammatory mediators including eicosanoids [Goetzl E.J., An S. & Smith W.I. (1995) FASEB 9, 1051-1058] chemokines and cytokines [see Arai K-I, Lee F., Miyajima A., Miyatake S., Arai N. & Yokata T (1990) Ann. Rev. Biochemistry 59, 783-836.] Given the range of tissues, cells and mediators involved, the inflammatory response in different disease states has many common
5 features and also many unique features. It is likely that novel genes that are identified from the eosinophil could play an exclusive role in eosinophil biology as it pertains to asthma, but also to other eosinophilic diseases such as atopic dermatitis, hyper-eosinophilic syndrome or pulmonary fibrosis. Novel genes identified in the eosinophil may play other important roles, for example in the biology of other leukocytes; the pathology of inflammatory lung disease other than asthma;
10 or the pathology of any other inflammatory diseases such as rheumatoid arthritis, inflammatory bowel disease (IBD), etc.

Asthma is a chronic inflammatory disease of the airways that is characterised by airway hyper-reactivity to exogenous stimuli, inflammatory cell accumulation and airway remodelling. In
15 general terms, asthma causes chronic recurring episodes of coughing, wheezing, chest tightness and difficulty in breathing which can progress to life threatening severity. Exogenous stimuli responsible for precipitating an asthma attack can include airborne antigens, (pollens, dust mite antigens etc), chemical irritants in pollution, orally derived antigens and other unspecified stimuli. Whilst there is believed to be a genetic predisposition to disease, with an estimated 40-
20 60% heritability, environmental factors undoubtedly play a causal role. Symptomatically the disease can be segmented into intermittent disease with sporadic episodes, persistent disease with mild, moderate and severe severity, and acute severe episodes. Current treatments for asthma range from intermittent bronchodilator therapy (inhaled on demand) to chronic high dose glucocorticosteroids. The use of glucocorticoids in particular is compromised by side effects,
25 notably growth suppression in children that may result from disruption of normal endocrine control of growth and/or a direct effect on bone metabolism in both children or adults. Thus, the identification of novel therapies capable of resolving the chronic inflammatory process without causing side effects would be advantageous. At present many treatments for asthma rely on inhalation delivery. The development of novel, safe, oral therapy with a low frequency of dosing
30 would be particularly advantageous. Many aspects of airway dysfunction are a direct consequence of the underlying airway inflammation that is initiated and sustained by inappropriate proliferation, and/or recruitment and/ or activation of T lymphocytes, B lymphocytes and eosinophils. Asthmatic lungs are characterised by large populations of infiltrating CD4⁺ T cells that secrete pro-inflammatory cytokines including IL4, IL13 and IL5.
35 Such T cells are clonally selected by prior exposure to specific antigens and will then respond to secondary antigen exposure with clonal expansion and the production of pro-inflammatory

mediators. However a key characteristic of asthma is systemic and airway eosinophilia. Eosinophils are terminally differentiated leukocytes which make up less than 1% of the leukocyte population in normal individuals and concomitantly trafficking of eosinophils through the normal airways is low. By contrast in asthmatics the circulating levels of eosinophils rises dramatically and can constitute 5-10% of the leukocyte population. Eosinophil myelopoiesis occurs in the bone marrow under the influence of T cell derived cytokines such as IL3, GM-CSF and IL5. These circulating eosinophils are actively recruited into the airways by chemo-attractants, including chemokines (eotaxin, RANTES) and leukotriene B₄. Eosinophils bind to vascular endothelial cells in the airways in an integrin dependent manner and then migrate into the tissues. In normal airways such migrating cells undergo apoptosis and are rapidly cleared, whereas in asthmatics eosinophils are rescued from apoptosis by pro-inflammatory cytokines, including interleukin-5. Together, the increase in availability, recruitment and longevity of eosinophils establishes a tissue eosinophilia in the asthmatic lung. Once resident in the airways eosinophils are activated by a range of pro-inflammatory stimuli including peptido-leukotrienes, platelet activating factor (PAF) complement and sensory neuropeptides. Activation causes the eosinophils to release toxic mediators including major basic protein, eosinophil derived neurotoxin and eosinophil cationic protein that are responsible for direct tissue injury notably within the sub-epithelial basement membrane. In addition eosinophils themselves generate pro-inflammatory cytokines and eicosanoids.

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It is therefore apparent that the eosinophil plays an important causal role in the pathogenesis of inflammatory diseases such as asthma and thus represents an important cellular target for the identification and exploitation of novel drug targets. The most effective anti-inflammatory treatment for asthma which has an impact on eosinophilia is the use of glucocorticosteroids. It is worth noting that the eosinophil, unlike the T cell and the neutrophil is an expendable commodity in normal physiology, given that the normal function of the eosinophil is targetting, killing and expulsion of parasites during chronic parasitic infections.

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Another inflammatory disease is COPD (chronic obstructive pulmonary disease) which is characterised by irreversible airway obstruction and encompasses both chronic bronchitis and emphysema. Although COPD has a clinical phenotype and an aetiology that is quite distinct from asthma, as an inflammatory lung disease COPD also has characteristics common to asthma. The major conditions commonly contributing to COPD are chronic bronchitis and emphysema. Changes in airway resistance arises from loss of elastic recoil, narrowing of the distal airways and changes to the airway wall contribute to intrinsic air flow obstruction. The most important risk factor for the development of COPD is cigarette smoking. However it is estimated that only

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15% of smokers go on to develop symptoms of COPD. In COPD, lung inflammation predominantly involves neutrophils, interleukin-8 is the cytokine which is most strikingly increased and the increased lymphocytes are type 1 helper T-cells (CD8 T-cells). However the precise role of neutrophils in the lumen of the airways in COPD is not yet established, but it is likely that the release of enzymes such as neutrophil elastase and matrix metalloproteinases (MMP) may contribute to the pathophysiology of the disease. Macrophage numbers are increased by 5-10 times in the airways of patients with COPD and these cells play an important role in driving the inflammatory process by directly producing inflammatory mediators including proteases and neutrophil chemotactic factors. In particular macrophages may be responsible for the continued proteolytic activity observed in the lungs of patients with emphysema. It is likely that some of the novel genes described here may play a role in macrophage or neutrophil biology and as such may play a contributory role in the pathology of COPD. The current therapies for COPD provide modest therapeutic benefit and there are no currently available treatments that influence its progressive cause. In contrast to asthma, COPD is resistant to treatment with glucocorticosteroids and the disease is treated symptomatically with anti-infectives, bronchodilators and mucolytics. Recent data suggest that PDE4 inhibitors may be effective in COPD.

A number of other diseases have been identified that are associated with hyper-eosinophilia [see Kroegel C., Warner J.A., Virchow J.C. & Matthys H. (1994) The Eosinophil Leucocyte(partII)Eur. Resp. J. 7, 743-760. These include allergic disorders such as atopic dermatitis and NERDS (nodules eosinophilia, rheumatism, dermatitis and swelling), vasculitic granulomatous diseases including polyarteritis and Wegeners granulomatosis, auto-immune diseases, interstitial and other pulmonary diseases including eosinophilic pneumonia, sarcoiditis and idiopathic pulmonary fibrosis, and neoplastic and myoproliferative diseases including hypereosinophilic syndrome, T cell lymphoma and hodgkins disease.

Thus, there is a need in the art to suppress or inhibit the eosinophil functions that render these leukocytes pivotal in the pathogenesis of inflammatory diseases, particularly asthma. Naturally, such functions are likely to be important in other inflammatory processes involving eosinophils. In particular, there is a need to identify genes that are expressed inappropriately in asthmatics, compared to normals, and which may thus represent suitable targets for pharmaceutical intervention. There is further a need to identify genes encoding proteins that are expressed in normal eosinophils, which regulate eosinophil activation, but that are absent, not expressed normally, or function poorly in asthmatics. There is a particular need to identify genes encoding proteins that affect eosinophil development (myelopoiesis), recruitment (adhesion, chemotaxis),

and longevity (e.g. genes involved in apoptosis, or production of chemokines, cytokines, metabolic proteins and toxic secretory proteins). There is also a need to identify genes and gene products that are of diagnostic value, which permit or assist in the diagnosis and differentiation of conditions characterised by inflammation, for example diseases which may cause symptoms such as wheeze, cough, tightness of the chest, breathing difficulties and/or the presence of inflammatory mediators or leukocytes in the airways. There is also a need to identify genes and gene products that are of prognostic value, to assist in the treatment of inflammatory disease such as asthma or which permit different treatments to be evaluated.

10 There is also a need to identify genes and gene products that are of therapeutic value, which permit or assist in the treatment of inflammatory disease, such as those characterised by wheeze, cough, tightness of the chest difficulty breathing and/or the presence of inflammatory mediators or leukocytes in the airways.

15 There is also a need to identify genes and gene products whose action can be modified to provide new modes of therapeutic intervention, to assist in the treatment and management of inflammatory disease, such as those characterised by wheeze, cough, tightness of the chest difficulty breathing and/or the presence of inflammatory mediators or leukocytes in the airways.

20 BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 depicts Gel analysis of RNA isolated using the RNazol modified methodology (lane 1: Eosinophils, lane 2: Neutrophils, lane 3: Molecular weight marker).

Figure 2 shows the size range of the amplified cDNA which was between 200bp and 7kb.

Figure 3 shows a restriction digest of a cDNA library.

25 Figure 4 shows replacement primers for SMART PCR cDNA synthesis kit.

Figure 5 shows the additional 8bp sites which are used to modify the pSKII (Stratagene) vector.

DEFINITIONS

The following definitions are provided to facilitate understanding of certain terms used frequently herein:-

In a specific embodiment, the term "about" or "approximately" means within 20%, preferably within 10%, and more preferably within 5% of a given value or range.

10 "Agonist", as used herein, refers to a molecule which, when bound to a polypeptide of the invention increases or prolongs the duration of the effect of the polypeptide. Agonists may include proteins, nucleic acids, carbohydrates or any other molecules which bind to and modulate the activity of a polypeptide of the invention.

15 "Amplification", as used herein, relates to the production of additional copies of a nucleic acid sequence. Amplification is generally carried out using polymerase chain reaction (PCR) technologies well known in the art. (See, e.g., Dieffenbach, C.W. and G.S. Dveksler (1995) PCR Primer, a Laboratory Manual, Cold Spring Harbor Press, Plainview, NY, pp. 1-5.)

20 "Antagonist", as used herein, refers to a molecule which when bound to a polypeptide of the invention decreases the amount or the duration of the effect or the immunological activity of a polypeptide of the invention. Antagonists may include proteins, nucleic acids, carbohydrates, antibodies or any other molecule which decrease the effect of a polypeptide of the invention.

25 "Antibodies", as used herein, includes polyclonal and monoclonal antibodies, chimeric, single chain, and humanized antibodies as well as Fab fragments, including the products of an Fab or other immunoglobulin expression library.

30 "Antigenic determinant", as used herein, refers to that fragment of a molecule (i.e. an epitope) that makes contact with a particular antibody. When a protein or a fragment of a protein is used to immunise a host animal, numerous regions of the protein may induce the production of antibodies which bind specifically to antigenic determinants (given regions or three-dimensional structures on the protein). An antigenic determinant may compete with
35 the intact antigen (i.e., the immunogen used to elicit the immune response) for binding to an antibody.

"Antisense", as used herein, refers to any composition containing a nucleic acid sequence which is complementary to a specific nucleic acid sequence. The term "antisense strand" is used in reference to a nucleic acid strand that is complementary to the "sense" strand. Antisense molecules may be produced by any method including synthesis or transcription. Once introduced into a cell, the complementary nucleotides combine with natural sequences produced by the cell to form duplexes and to down regulate or block either transcription or translation. The designation "negative" can refer to the antisense strand, and the designation "positive" can refer to the sense strand.

"Biologically active", as used herein, refers to a protein having structural, regulatory, or biochemical functions of a naturally occurring molecule. Likewise, "immunologically active" refers to the capability of the natural, recombinant, or synthetic protein, or of any oligopeptide thereof, to induce a specific immune response in appropriate animals or cells and to bind with specific antibodies.

"Cassette", as used herein, refers to a segment of DNA that can be inserted into a vector at specific restriction sites. The segment of DNA encodes a polypeptide of interest, and the cassette and restriction sites are designed to ensure insertion of the cassette in the proper reading frame for transcription and translation.

"Cloning vector", as used herein, is a replicon, such as plasmid, phage or cosmid, to which another DNA segment may be attached so as to bring about the replication of the attached segment. Cloning vectors may be capable of replication in one cell type, and expression in another ("shuttle vector").

"Coding sequence", as used herein, is a double-stranded DNA sequence which is transcribed and translated into a polypeptide in a cell *in vitro* or *in vivo* when placed under the control of appropriate regulatory sequences. The boundaries of the coding sequence are determined by a start codon at the 5' (amino) terminus and a translation stop codon at the 3' (carboxyl) terminus. A coding sequence can include, but is not limited to, prokaryotic sequences, cDNA from eukaryotic mRNA, genomic DNA sequences from eukaryotic (e.g., mammalian) DNA, and even synthetic DNA sequences. If the coding sequence is intended for expression in a eukaryotic cell, a polyadenylation signal and transcription termination sequence will usually be located 3' to the coding sequence.

"Complementary" or "complementarity", as used herein, refer to the natural binding of polynucleotides under permissive salt and temperature conditions by base pairing. For example, the sequence "A-G-T" binds to the complementary sequence "T-C-A."

5 Complementary between two single-stranded molecules may be "partial" such that only some of the nucleic acids bind, or it may be "complete" such that total complementarity exists between the single stranded molecules. The degree of complementarity between nucleic acid strands has significant effects on the efficiency and strength of the hybridization between the nucleic acid strands. This is of particular importance in amplification reactions, which
10 depend upon binding between nucleic acids strands.

A "composition comprising a given polynucleotide sequence" or a "composition comprising a given amino acid sequence", as these terms are used herein, refer broadly to any composition containing the given polynucleotide or amino acid sequence. The composition
15 may comprise a dry formulation, an aqueous solution, or a sterile composition. Compositions comprising polynucleotide sequences may be employed as hybridization probes. The probes may be stored in freeze-dried form and may be associated with a stabilising agent such as a carbohydrate. In hybridisation's, the probe may be deployed in an aqueous solution containing salts (e.g NaCl), detergents (e.g., SDS), and other components (e.g., Denhardt's
20 solution, dried milk, salmon sperm DNA, etc.).

"Consensus sequence", as used herein, refers to a nucleic acid sequence which has been resequenced to resolve uncalled bases, extended using XL-PCRTM (Perkin Elmer, Norwalk, CT) in the 5' and/or the 3' direction, and resequenced, or which has been assembled from the
25 overlapping sequences of more than one Clone using a computer program for fragment assembly, such as the GELVIEWTM Fragment Assembly system (GCG, Madison, W I). Some sequences have been both extended and assembled to produce the consensus sequence .

The term "corresponding to" is used herein to refer to similar or homologous sequences,
30 whether the exact position is identical or different from the molecule to which the similarity or homology is measured. A nucleic acid or amino acid sequence alignment may include spaces. Thus, the term "corresponding to" refers to the sequence similarity, and not the numbering of the amino acid residues or nucleotide bases.

35 "Deletion", as the term is used herein, refers to a change in the amino acid or nucleotide sequence that results in the absence of one or more amino acid residues or nucleotides.

5 **"Derivative"**, as used herein, refers to the chemical modification of a polynucleotide sequence. Chemical modifications of a polynucleotide sequence can include, for example, replacement of hydrogen by an alkyl, acyl, or amino group. A derivative polynucleotide encodes a polypeptide which retains at least one biological or immunological function of the natural molecule. A derivative polypeptide is one modified by glycosylation, pegylation, or any similar process that retains at least one biological or immunological function of the polypeptide from which it was derived.

10 **"Gene"**, as used herein, refers to an assembly of nucleotides that encode a polypeptide, and includes cDNA and genomic DNA nucleic acids.

15 **"Heterologous DNA"**, as used herein, refers to DNA not naturally located in the cell, or in a chromosomal site of the cell. Preferably, the heterologous DNA includes a gene foreign to the cell.

"Heterologous protein", as used herein, refers to a protein not naturally produced in the cell.

20 **"Homologous recombination"**, as used herein, refers to the insertion of a foreign DNA sequence into another DNA molecule, e.g., insertion of a vector in a chromosome. Preferably, the vector targets a specific chromosomal site for homologous recombination. For specific homologous recombination, the vector will contain sufficiently long regions of homology to sequences of the chromosome to allow complementary binding and incorporation of the vector into the chromosome. Longer regions of homology, and greater degrees of sequence similarity, may increase the efficiency of homologous recombination.

30 **"Homology"**, as used herein, refers to a degree of complementarity. There may be partial homology or complete homology. The word "identity" may substitute for the word "homology." A partially complementary sequence that at least partially inhibits an identical sequence from hybridising to a target nucleic acid is referred to as "substantially homologous." The inhibition of hybridization of the completely complementary sequence to the target sequence may be examined using a hybridization assay (Southern or Northern blot, solution hybridization, and the like) under conditions of reduced stringency. A substantially homologous sequence or hybridization probe will compete for and inhibit the binding of a completely homologous sequence to the target sequence under conditions of reduced

stringency. This is not to say that conditions of reduced stringency are such that non-specific binding is permitted, as reduced stringency conditions require that the binding of two sequences to one another be a specific (i.e., a selective) interaction. The absence of non-specific binding may be tested by the use of a second target sequence which lacks even a partial degree of complementarity (e.g., less than about 30% homology or identity). In the absence of non-specific binding, the substantially homologous sequence or probe will not hybridise to the second non-complementary target sequence.

"Human artificial chromosomes (HACs)", as used herein, are linear microchromosomes which may contain DNA sequences of 10K to 10 M in size and contain all of the elements required for stable mitotic chromosome segregation and maintenance (Harrington J.J. et al.(1997) Nat Genet. 15:345-355).

"Hybridization", as used herein, refers to any process by which a strand of nucleic acid binds to another complementary nucleic acid molecule, such as a cDNA, genomic DNA, or RNA, through base pairing. A single stranded form of the nucleic acid molecule can anneal to the other nucleic acid molecule under the appropriate conditions of temperature and solution ionic strength (see Sambrook et al., *supra*). The conditions of temperature and ionic strength determine the "stringency" of the hybridization. For preliminary screening for homologous nucleic acids, low stringency hybridization conditions, corresponding to a T_m of 55°, can be used, e.g., 5x SSC, 0.1% SDS, 0.25% milk, and no formamide; or 30% formamide, 5x SSC, 0.5% SDS). Moderate stringency hybridization conditions correspond to a higher T_m , e.g., 40% formamide, with 5x or 6x SCC. High stringency hybridization conditions correspond to the highest T_m , e.g., 50% formamide, 5x or 6x SCC. Hybridization requires that the two nucleic acids contain complementary sequences, although depending on the stringency of the hybridization, mismatches between bases are possible. The appropriate stringency for hybridising nucleic acids depends on the length of the nucleic acids and the degree of complementation, variables well known in the art. The greater the degree of similarity or homology between two nucleotide sequences, the greater the value of T_m for hybrids of nucleic acids having those sequences. The relative stability (corresponding to higher T_m) of nucleic acid hybridizations decreases in the following order: RNA:RNA, DNA:RNA, DNA:DNA. For hybrids of greater than 100 nucleotides in length, equations for calculating T_m have been derived (see Sambrook et al., *supra*, 9.50-0.51). For hybridization with shorter nucleic acids, i.e., oligonucleotides, the position of mismatches becomes more important, and the length of the oligonucleotide determines its specificity (see Sambrook et al., *supra*, 11.7-11.8). Preferably a minimum length for a hybridizable nucleic acid is at least about 10 nucleotides;

preferably at least about 15 nucleotides; and more preferably the length is at least about 20 nucleotides.

5 "Hybridization complex", as used herein, refers to a complex formed between two nucleic acid sequences by virtue of the formation of hydrogen bonds between complementary bases. A hybridization complex may be formed in solution (e.g., Cot or Rot analysis) or formed between one nucleic acid sequence present in solution and another nucleic acid sequence immobilised on a solid support (e.g., paper, membranes, filters, chips, pins or glass slides, or any other appropriate substrate to which cells or their nucleic acids have been fixed).

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The words "insertion" or "addition", as used herein, refer to changes in an amino acid or nucleotide sequence resulting in the addition of one or more amino acid residues or nucleotides, respectively, to the sequence found in the naturally occurring molecule.

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"Identity" is a measure of the homology of nucleotide sequences or amino acid sequences. In general, the sequences are aligned so that the highest order match is obtained. 'Identity' *per se* has an art-recognised meaning and can be calculated using published techniques. See, e.g.: (COMPUTATIONAL MOLECULAR BIOLOGY, Losk, A.M., ed., Oxford University Press, New York, 1988; BIOCOMPUTING: INFORMATICS AND GENOME PROJECTS, Smith, D.W., ed., Academic Press, New York, 1993" COMPUTER ANALYSIS OF SEQUENCE DATA, PART 1, Griffin, A.M and Griffin, H.G., eds., Humane Press, New Jersey, 1994; SEQUENCE ANALYSIS IN MOLECULAR BIOLOGY, vol Heinjo, G., Academic Press, 1987; and SEQUENCE ANALYSIS PRIMER, Gribskov, M. and Devereux, J., eds., M Stockton Press, New York, 1 991). While there exist a number of methods to measure identity between two polynucleotide or polypeptide sequences, the term "identity" is well known to skilled artisans (Carillo, H., and Lipton, D., *SIAM J AppliadMath* (1 988) 48:1073). Methods commonly employed to determine identity or similarity between two sequences include, but are not limited to, those disclosed in Guide to Huge Computers, Martin J. Bishop, ed., Academic Press, San Diego, 1994, and Carillo, H., and Lipton, D., *SIAM J Applied Math* (1 988) 48:1073. Methods to determine identity and similarity are codified in computer programs. Preferred computer program methods to determine identity and similarity between two sequences include, but are not limited to, GCS program package (Devereux, J., *otal*, *NucloicAcids Research* (1984) 12(1):387), BLASTP, BLASTN, FASTA (Atschul, S.F. *et a/*, *J Molec Biol*(1 990) 215:403). As an illustration, by a polynucleotide having a nucleotide sequence having at least, for example, 95% "identity" to a reference nucleotide sequence of SEO ID NO:1 is intended that the nucleotide sequence of the

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polynucleotide is identical to the reference sequence except that the polynucleotide sequence may include up to five point mutations per each 100 nucleotides of the reference nucleotide sequence of SEQ ID NO: 1. In other words, to obtain a polynucleotide having a nucleotide sequence at least 95% identical to a reference nucleotide sequence, up to 5% of the nucleotides in the reference sequence may be deleted or substituted with another nucleotide, or a number of nucleotides up to 5% of the total nucleotides in the reference sequence may be inserted into the reference sequence. These mutations of the reference sequence may occur at the 5' or 3' terminal positions of the reference nucleotide sequence or anywhere between those terminal positions, interspersed either individually among nucleotides in the reference sequence or in one or more contiguous groups within the reference sequence. Similarly, by a polypeptide having an amino acid sequence having at least, for example, 95% "identity" to a reference amino acid sequence SEQ ID NO:2 it is intended that the amino acid sequence of the polypeptide is identical to the reference sequence except that the polypeptide sequence may include up to five amino acid alterations per each 100 amino acids of the reference amino acid of SEQ ID NO: 2. In other words, to obtain a polypeptide having an amino acid sequence at least 95% identical to a reference amino acid sequence, up to 5% of the amino acid residues in the reference sequence may be deleted or substituted with another amino acid, or a number of amino acids up to 5% of the total amino acid residues in the reference sequence may be inserted into the reference sequence. These alterations of the reference sequence may occur at the amino or carboxy terminal positions of the reference amino acid sequence or anywhere between those terminal positions, interspersed either individually among residues in the reference sequence or in one or more contiguous groups within the reference sequence. Percent identity or homology is a measure of the relationship between two polypeptide sequences. In general the two sequences to be compared are aligned to give a maximum correlation between the sequences. The alignment of the two sequences is examined and the number of positions giving an exact amino-acid or nucleotide correspondence between the two sequences determined, divided by the total length of the alignment and multiplied by 100 to give a % identity figure. This % identity figure may be determined over the whole length of the sequences to be compared, which is particularly suitable for sequences of the same or very similar length and which are highly homologous, or over shorter defined lengths, which is more suitable for sequences of unequal length or which have a lower level of homology.

"Immune response", as used herein, can refer to conditions associated with inflammation, trauma, immune disorders, or infectious or genetic disease, etc. These conditions can be characterised by expression of various factors, e.g., cytokines, chemokines, and other signalling molecules, which may affect cellular and systemic defence systems.

"Inflammatory disease" includes disease or conditions which are typically, but not exclusively characterised by wheeze, cough, tightness of chest, breathing difficulties and/or the presence of inflammatory mediators such as leukocytes in the airways.

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"Isolated", as used herein, means altered "by hand of man" from the natural state. If an "isolated" composition or substance occurs in nature, it has been changed or removed from its original environment, or both. For example, a polynucleotide or a polypeptide naturally present in a living animal is not "isolated" but the same polynucleotide or polypeptide separated from the coexisting materials of its natural state is "isolated" as the term is employed herein.

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"Microarray", as used herein, refers to an arrangement of distinct polynucleotides arrayed on a substrate, e.g., paper, nylon or any other type of membrane, filter, chip, glass slide, or any other suitable solid support.

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"Modulate", as used herein, refers to a change in the activity. For example modulation may cause an increase or a decrease in activity, binding characteristics, or any other biological, functional, or immunological properties and result in total inhibition or total activation.

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"Nucleic acid", as used herein, is a polymeric compound comprised of covalently linked subunits called nucleotides. Nucleic acid includes polyribonucleic acid (RNA) and polydeoxyribonucleic acid (DNA), both of which may be single-stranded or double-stranded. DNA includes cDNA, genomic DNA, synthetic DNA, and semi-synthetic DNA.

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"Oligonucleotide", as used herein, refers to a nucleic acid sequence, of at least about 6 nucleotides to 60 nucleotides, preferably about 15 to 30 nucleotides, more preferably about 20 to 25 nucleotides, and most preferably at least 18 nucleotides, that is hybridizable to a genomic DNA molecule, a cDNA molecule, or an mRNA molecule. Oligonucleotides can be labelled, e.g., with ³²P-nucleotides or nucleotides to which a label, such as biotin, has been covalently conjugated. In one embodiment, a labelled oligonucleotide can be used as a probe to detect the presence of a nucleic acid. In another embodiment, oligonucleotides (one or both of which may be labelled) can be used as PCR primers, either for cloning full length sequences or fragments thereof, or to detect the presence of specific polynucleotides. In a further embodiment, an oligonucleotide of the invention can form a triple helix with a DNA

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molecule. In further embodiments they can be in hybridization assays or microarrays. Generally, oligonucleotides are prepared synthetically, preferably on a nucleic acid synthesiser. Accordingly, oligonucleotides can be prepared with non-naturally occurring phosphoester analog bonds, such as thioester bonds, etc. As used herein, the term
5 "oligonucleotide" is substantially equivalent to the terms "amplimer," "primer," "oligomer," and "probe," as these terms are commonly defined in the art.

"Peptide nucleic acid (PNA)", as used herein, refers to an antisense molecule or anti-gene agent which comprises an oligonucleotide of at least about 5 nucleotides in length linked to a
10 peptide backbone of amino acid residues ending in lysine. The terminal lysine confers solubility to the composition. PNAs preferentially bind complementary single stranded DNA and RNA and stop transcript elongation, and may be pegylated to extend their lifespan in the cell. (See eg., Nielsen, P. E. et al (1993) Anticancer Drugs Des. 8:53-63).

"Polynucleotide" generally refers to any polyribonucleotide or polydeoxribonucleotide, which may be unmodified RNA or DNA or modified RNA or DNA. "polynucleotides" include, without limitation single- and double-stranded DNA, DNA that is a mixture of single- and double-stranded regions, single- and double-stranded RNA, and RNA that is mixture of single- and double-stranded regions, hybrid molecules comprising DNA and RNA that may be
20 single-stranded or, more typically, double-stranded or a mixture of single- and double-stranded regions. In addition, 'polynucleotide' refers to triple-stranded regions comprising RNA or DNA or both RNA and DNA. The term polynucleotide also includes DNAs or RNAs containing one or more modified bases and DNAs or RNAs with backbones modified for stability or for other reasons. "Modified" bases include, for example, tritylated bases and
25 unusual bases such as inosine. A variety of modifications have been made to DNA and RNA; thus, "polynucleotide" embraces chemically, enzymatically or metabolically modified forms of polynucleotides as typically found in nature, as well as the chemical forms of DNA and RNA characteristic of viruses and cells. 'Polynucleotide' also embraces relatively short polynucleotides, often referred to as oligonucleotides.

"Polypeptide", as used herein, refers to any peptide or protein comprising two or more amino acids joined to each other by peptide bonds or modified peptide bonds, i.e., peptide isosteres. "Polypeptide" refers to both short chains, commonly referred to as peptides, oligopeptides or oligomers, and to longer chains, generally referred to as proteins.
35 Polypeptides may contain amino acids other than the 20 gene-encoded amino acids. 'Polypeptides' include amino acid sequences modified either by natural processes, such as

post-translational processing, or by chemical modification techniques which are well known in the art. Such modifications are well described in basic texts and in more detailed monographs, as well as in the research literature. Modifications can occur anywhere in a polypeptide, including the peptide backbone, the amino acid side-chains and the amino or carboxyl termini. It will be appreciated that the same type of modification may be present in the same or varying degrees at several sites in a given polypeptide. Also, a given polypeptide may contain many types of modifications. Polypeptides may be branched as a result of ubiquitination, and they may be cyclic, with or without branching. Cyclic, branched and branched cyclic polypeptides may result from post-translation natural processes or may be made by synthetic methods. Modifications include acetylation, acylation, ADP-ribosylation, amidation, covalent attachment of flavin, covalent attachment of a heme moiety covalent attachment of a nucleotide or nucleotide derivative, covalent attachment of a lipid or lipid derivative, covalent attachment of phosphatidylinositol, cross-linking, cyclization, disulphide bond formation, demethylation, formation of covalent crosslinks, formation of cystine, formation of pyroglutamate, formylation, gamma-carboxylation, glycosylation, GPI anchor formation, hydroxylation, iodination, methylation, myristoylation, oxidation, proteolytic processing, phosphorylation, prenylation, racemization, selenoylation, sulfation, transfer-RNA mediated addition of amino acids to proteins such as arginylation, and ubiquitination. See, for instance, **PROTEINS - STRUCTURE AND MOLECULAR PROPERTIES**, 2nd Ed., T. E. Creighton, W. H. Freeman and Company, New York, 1993 and Wold, F, **Posttranslational Protein Modifications: Perspectives and Prospects**, pgs. 1-12 in **POSTTRANSLATIONAL COVALENT MODIFICATION OF PROTEINS**, B.C. Johnson, Ed., Academic Press, New York, 1983; Seifter *et al.*, 'Analysis for protein modifications and non-protein cofactors', *Meth Enzymol* (1990) 182:626-646 and Rattan *et al.*, 'Protein Synthesis: Post-translational Modifications and Aging', *Ann NY Acad Sci* (1992) 663:48-62.

"Probe(s)", as used herein, is a sequence specific polynucleotide or oligonucleotide which is used in the procedure of hybridisation to identify, interrogate or probe, a complex mixture of polynucleotides in a sample, or target through sequence specific complementarity. The probe may be tagged with a label (radioactive, fluorescent or other) as a means to identify complementary polynucleotides. Alternatively the probe may be attached to, or synthesised on the surface of a chip, slide, filter or other material. In the latter instance the target or sample may be labelled (radioactive, fluorescent or other). The term Probe, is also used to describe the use of an 'electronic' sequence specific polynucleotide or oligonucleotide which is used in the procedure of 'electronic' hybridisation to identify, interrogate or probe, a complex mixture

of 'electronic' polynucleotides in a database or file through sequence specific complementarity.

5 "Promoter sequence", as used herein, is a DNA regulatory region capable of binding RNA polymerase in a cell and initiating transcription of a downstream (3' direction) coding sequence. For purposes of defining the present invention, the promoter sequence is bounded at its 3' terminus by the transcription initiation site and extends upstream (5' direction) to include the minimum number of bases or elements necessary to initiate transcription at levels detectable above background. Within the promoter sequence will be found a transcription
10 initiation site (conveniently defined for example, by mapping with nuclease S1), as well as protein binding domains (consensus sequences) responsible for the binding of RNA polymerase.

15 "Recombinant DNA molecule", as used herein, is a DNA molecule that has undergone a molecular biological manipulation.

"Regulatory region", as used herein, means a nucleic acid sequence which regulates the expression of a second nucleic acid sequence. A regulatory region may include sequences which are naturally responsible for expressing a particular nucleic acid (a homologous region)
20 or may include sequences of a different origin which are responsible for expressing different proteins or even synthetic proteins (a heterologous region). In particular, the sequences can be sequences of eukaryotic or viral genes or derived sequences which stimulate or repress transcription of a gene in a specific or non-specific manner and in an inducible or non-inducible manner. Regulatory regions include origins of replication, RNA splice sites, promoters, enhancers, transcriptional termination sequences, signal sequences which direct
25 the polypeptide into the secretory pathways of the target cell, and promoters.

"Sample", as used herein, may comprise a bodily fluid; an extract from a cell, chromosome, organelle, or membrane isolated from a cell; a cell; genomic DNA, RNA, or
30 cDNA, in solution or bound to a solid support; a tissue; a tissue print; etc.

"Sequence similarity" or "homology", as used herein, refers to the degree of identity or correspondence between nucleic acid or amino acid sequences of proteins that may or may not share a common evolutionary origin (see Reeck et al., supra). However, in common usage and
35 in the instant application, the term "homologous," when modified with an adverb such as "highly," may refer to sequence similarity and not a common evolutionary origin. In a

specific embodiment, two DNA sequences are "substantially homologous" or "substantially similar" when at least about 50% (preferably at least about 75%, and most preferably at least about 90 or 95%) of the nucleotides match over the defined length of the DNA sequences. Sequences that are substantially homologous can be identified by comparing the sequences using standard software available in sequence data banks, or in a Southern hybridization experiment under, for example, stringent conditions as defined for that particular system. Defining appropriate hybridization conditions is within the skill of the art. See, e.g., Maniatis et al., supra; DNA Cloning, Vols. I & II, supra; Nucleic Acid Hybridization, supra. Two amino acid sequences are "substantially homologous" or "substantially similar" when greater than about 40% of the amino acids are identical, or greater than 60% are similar (functionally identical). Preferably, the similar or homologous sequences are identified by alignment using, for example, the GCG (Genetics Computer Group, Program Manual for the GCG Package, Version 7, Madison, Wisconsin) pileup program.

"Signal sequence", as used herein, is a sequence included at the beginning of the coding sequence of a protein to be expressed on the surface of a cell. This sequence encodes a signal peptide, N-terminal to the mature polypeptide, that directs the host cell to translocate the polypeptide. The term "translocation signal sequence" is used herein to refer to this sort of signal sequence. Translocation signal sequences can be found associated with a variety of proteins native to eukaryotes and prokaryotes, and are often functional in both types of organisms.

"Specific binding" or "specifically binding", as used herein, refer to the interaction between a protein or peptide and an agonist, an antibody, or an antagonist. The interaction is dependent upon the presence of a particular structure of the protein, e.g., the antigenic determinant or epitope, recognised by the binding molecule. For example, if an antibody is specific for epitope "A," the presence of a polypeptide containing the epitope A, or the presence of free unlabeled A, in a reaction containing free labelled A and the antibody will reduce the amount of labelled A that binds to the antibody.

"Standard hybridization conditions", as used herein, refers to a T_m of 55°C, and utilises conditions as set forth above. In a preferred embodiment, the T_m is 60°C; in a more preferred embodiment, the T_m is 65°C

"Stringent conditions", as used herein, refers to conditions which permit hybridization between polynucleotide sequences and the claimed polynucleotide sequences. Suitably

stringent conditions can be defined by, for example, the concentrations of salt or formamide in the prehybridization and hybridization solutions, or by the hybridization temperature, and are well known in the art. In particular, stringency can be increased by reducing the concentration of salt, increasing the concentration of formamide, or raising the hybridization temperature. For example, hybridization under high stringency conditions could occur in about 50% formamide at about 37°C to 42°C. Hybridization could occur under reduced stringency conditions in about 35% to 25% formamide at about 30°C to 35°C. In particular, hybridization could occur under high stringency conditions at 42°C in 50% formamide, 5X SSPE, 0.3% SDS, and 200 µg/ml sheared and denatured salmon sperm DNA. Hybridization could occur under reduced stringency conditions as described above, but in 35% formamide at a reduced temperature of 35°C. The temperature range corresponding to a particular level of stringency can be further narrowed by calculating the purine to pyrimidine ratio of the nucleic acid of interest and adjusting the temperature accordingly. Variations on the above ranges and conditions are well known in the art.

"Substantially purified", as used herein, refers to nucleic acid or amino acid sequences that are removed from their natural environment and are isolated or separated, and are at least about 60% free, preferably about 75% free, and most preferably about 90% free from other components with which they are naturally associated.

"Substitution", as used herein, refers to the replacement of one or more amino acids or nucleotides by different amino acids or nucleotides, respectively.

"Transcriptional control sequences" and "translational control sequences", as used herein, are DNA regulatory sequences, such as promoters, enhancers, terminators, and the like, that provide for the expression of a coding sequence in a host cell. In eukaryotic cells, polyadenylation signals are control sequences. A coding sequence is "under the control" of transcriptional and translational control sequences in a cell when RNA polymerase transcribes the coding sequence into mRNA, which is then trans-RNA spliced (if the coding sequence contains introns) and translated into the protein encoded by the coding sequence.

"Transfection" by exogenous or heterologous DNA, as used herein, is when such DNA has been introduced inside the cell. A cell has been "transformed" by exogenous or heterologous DNA when the transfected DNA effects a phenotypic change. The transforming DNA can be integrated (covalently linked) into chromosomal DNA making up the genome of the cell.

"Transformation", as defined herein, describes a process by which exogenous DNA enters and changes a recipient cell. Transformation may occur under natural or artificial conditions according to various methods well known in the art, and may rely on any known method for the insertion of foreign nucleic acid sequences into a prokaryotic or eukaryotic host cell. The method for transformation is selected based on the type of host cell being transformed and may include, but is not limited to, viral infection, electroporation, heat shock, lipofection, and particle bombardment. The term "transformed" cells includes stably transformed cells in which the inserted DNA is capable of replication either as an autonomously replicating plasmid or as part of the host chromosome, as well as transiently transformed cells which express the inserted DNA or RNA for limited periods of time.

A "variant" of a polynucleotide or a polypeptide, as used herein, is any analogue, fragment, derivative, or mutant which is derived from a different reference polynucleotide or polypeptide and which retains at least one biological property of the reference polynucleotide or polypeptide. Variants of the polypeptide may exist in nature. These variants may be allelic variations characterised by differences in the nucleotide sequences of the structural gene coding for the protein, or may involve differential splicing or post-translational modification. The skilled artisan can produce synthetic polynucleotide or polypeptide variants. Changes in the nucleotide sequence of the variant may or may not alter the amino acid sequence of the polypeptide it encodes. Nucleotide changes may result in amino acid substitutions, additions, deletions, fusions and truncations in the polypeptide it encodes, as discussed below. A typical variant of a polypeptide differs in amino acid sequence from another, reference polypeptide. Generally, differences are limited so that the sequences of the reference polypeptide and the variant are closely similar overall and, in many regions, identical. A variant and reference polypeptide may differ in amino acid sequence by one or more substitutions, additions, replacements or deletions or in any combination thereof. A substituted or inserted amino acid residue may or may not be one encoded by the genetic code. Techniques for obtaining non-naturally occurring variants of polynucleotides and polypeptides include mutagenesis techniques, genetic (suppressions, deletions, mutations, etc.), chemical, and enzymatic techniques or by direct synthesis all of which are known to persons having ordinary skill in the art. Guidance in determining which amino-acid residues may be substituted inserted or deleted without abolishing biological or immunological activity may be found using computer programs well known in the art such as DNASTAR software.

"Vector", as used herein, is any means for the transfer of a nucleic acid into a host cell. A vector may be a replicon to which another DNA segment may be attached so as to bring about

the replication of the attached segment. A "replicon" is any genetic element (e.g., plasmid, phage, cosmid, chromosome, virus) that functions as an autonomous unit of DNA replication *in vivo*, i.e., capable of replication under its own control. The term "vector" includes both viral and nonviral means for introducing the nucleic acid into a cell *in vitro*, *ex vivo* or *in vivo*.

5 Viral vectors include retrovirus, adeno-associated virus, pox, baculovirus, vaccinia, herpes simplex, Epstein-Barr and adenovirus vectors, as set forth in greater detail below. Non-viral vectors include plasmids, liposomes, electrically charged lipids (cytofectins), DNA-protein complexes, and biopolymers. In addition to a nucleic acid, a vector may also contain one or more regulatory regions, and/or selectable markers useful in selecting, measuring, and

10 monitoring nucleic acid transfer results (transfer to which tissues, duration of expression, etc.).

DESCRIPTION OF THE INVENTION

15 The present invention is based on the identification and isolation of polynucleotides and polypeptides associated with eosinophil-mediated disease, particularly inflammatory disease such as asthma. The present invention also relates to the use of these polynucleotides and polypeptides in diagnosis, treatment or prevention of diseases mediated by eosinophils, and to the use of oligonucleotides derived from the above polynucleotides and polypeptides as probes or

20 primers for identification of complementary, related or contiguous oligonucleotides or as targets for screening for compounds with pharmaceutical utility or value.

In a first aspect, the present invention relates to polypeptide sequences comprising amino-acid sequences encoded by Seq ID Nos: 1-466 or fragments of those amino acid sequences.

25 In a preferred embodiment of the first aspect, the invention relates to variants of the amino-acid sequences encoded by Seq ID Nos: 1-466 or fragments of those amino acid sequences, the variants having at least about 80%, more preferably at least 85%, more preferably at least 90%, and most preferably 95% amino-acid sequence identity to the amino-acid sequences encoded by

30 Seq ID Nos: 1-466 or fragments of those amino acid sequences, and which share at least one functional or structural characteristic with the amino-acid sequences encoded by Seq ID Nos: 1-466 or fragments of those amino acid sequences.

In a second aspect the present invention relates to polynucleotide sequences which encode the

35 amino-acid sequences encoded by Seq ID Nos: 1-466 or fragments of those amino acid sequences. Preferably, the polynucleotide sequences of the second aspect are those of Seq ID Nos: 1-466.

In a preferred embodiment of the second aspect, the invention relates to variants of the polynucleotide sequences which encode the amino-acid sequences encoded by Seq ID Nos: 1-466, in particular the polynucleotide sequences of Seq ID Nos: 1-466; or fragments thereof. The variants may have at least about 80%, more preferably at least 85%, more preferably at least 90% and most preferably 95% polynucleotide sequence identity to the polynucleotide sequences which encode the amino-acid sequences encoded by Seq ID Nos: 1-466, in particular the polynucleotide sequences of Seq ID Nos: 1-466. Preferably, the polynucleotide variants described above encode an amino-acid sequence which shares at least one functional and/or structural characteristic with one or more of the amino-acid sequences encoded by Seq ID Nos: 1-466.

As will be appreciated by those skilled in the art, as a result of degeneracy of the genetic code, a multitude of polynucleotide sequences, some bearing minimal homology to the polynucleotide sequence of any known or naturally occurring gene, may be produced. Thus, the invention contemplates each and every possible variation of polynucleotide sequence that could be made by selecting combinations based on possible codon choices. These combinations are made in accordance with the standard triplet genetic code as applied to the naturally occurring polynucleotide sequence, and all such variations are to be considered as being specifically disclosed.

The polynucleotides of the present invention can be isolated from a number of sources, including genomic libraries, foetal genomic or cDNA libraries, or more preferably from human eosinophil cDNA libraries, preferably constructed from pooled eosinophils harvested from normal or diseased individuals. General methods for obtaining the polynucleotides and polypeptides of the present invention are well known in the art (as described by See, *e.g.*, Sambrook, Fritsch & Maniatis, *Molecular Cloning: A Laboratory Manual*, Second Edition (1989) Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York).

Genomics techniques were used to study the levels of expression of genes in eosinophils in order to identify the polynucleotides and polypeptides of the present invention which have a role in eosinophil processes which mediate disease. The expression pattern of a gene provides indirect information about its function. A polynucleotide or polypeptide which is selectively expressed in eosinophils is likely to be involved in pathologies associated with the eosinophil, such as asthma, COPD, allergic disorders such as atopic dermatitis and NERDS (nodules eosinophilia, rheumatism, dermatitis and swelling), vasculitic granulomatous diseases including polyarteritis and Wegeners granulomatosis, auto-immune diseases, interstitial and other pulmonary diseases

including eosinophilic pneumonia, sarcoiditis and idiopathic pulmonary fibrosis and neoplastic and myoproliferative diseases including hypereosinophilic syndrome, T cell lymphoma and hodgkins disease. Diversion from normal physiology is frequently accompanied by histological and biochemical changes, including changes in gene expression. The up- or down-regulation of gene activity can either be the cause of the pathophysiology or the result of the disease.

The polynucleotides and polypeptides of the present invention whose modulation results in the modification of eosinophil functions enable for the first time the provision of pharmaceuticals, therapeutic agents, drug targets, gene therapy targets, diagnostic and/or prognostic markers, antibodies which have utility as therapeutic, diagnostic, prognostic, histological or purification tools, and tools for use in the detection and isolation of further polynucleotide or polypeptide sequences which may play a role in eosinophil mediated inflammatory disease.

The identification and/or targetting of polynucleotides and polypeptides according to the first and second aspects of the invention enables the development, duration, progress, outcome, or the damage caused by a disease to be modified, and may even effect a cure. Means and methods for targetting the polynucleotides and/or polypeptides of the present invention may abolish or alleviate one or more symptom of inflammatory disease and/or limit the development, duration, progress, or outcome, of the disease or minimise the damage caused by it. The polynucleotides and polypeptides of the present invention which are not directly responsible for disease may be useful in alleviating or abolishing symptoms associated with the disease.

In particular, the polynucleotides and polypeptides of the present invention may represent attractive targets for drugs. For example, the polynucleotides may be useful targets or agents for gene therapy; the polypeptides may be useful targets for agonists or antagonists which modulate the effects of the polypeptide, and thus mediate a therapeutic effect. In this way, unwanted side effects, symptoms may be alleviated or abolished and causes of the disease may be wholly or partially removed.

Detailed profiling of polynucleotide expression levels in a variety of different tissues in normal and diseased individuals at different stages of disease progression or severity, and in response to a variety of stimuli such as cytokines IL5, drugs, and steroids resulted in the identification of polypeptides and polynucleotides of the present invention. The profiling also enabled indicators of disease stage or progression to be identified, and potential drug targets to be identified.

Animal disease models enable detailed profiling of gene expression under carefully controlled experimental conditions. For example, the gene expression pattern of a normal animal can be compared against that of a related animal which has been modified in a very specific manner to, such that it either over-or under-expresses one or more selected polynucleotide sequences, or fails to express certain polynucleotide sequences, either because it lacks a functioning copy of the DNA sequence, or because the expression of the sequence has been selectively blocked, for example using antisense oligonucleotides. Such studies provide additional insight into the cellular, animal and human physiology involved in the identification and validation of therapeutic targets.

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Investigations of the expression levels of genes in model cell lines mimicking critical eosinophil functions, such as adhesion, apoptosis, activation, myelopoiesis, synthesis of essential cellular components or mediators, and survival, aided the identification of the polynucleotides and polypeptides of the present invention which are expressed or active in the disease causing mechanisms mediated by eosinophils.

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Genomics technologies enable many genes to be studied 'in parallel', thereby increasing the chance of identifying a gene or protein which has a key role in diseases mediated by eosinophils. Accordingly, a genomics approach capable of simultaneously analysing the expression levels of large numbers of polynucleotides was utilised to maximise the probability of identifying genes specifically involved in disease processes mediated by eosinophils.

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Microarrays to which sequences of interest were applied were used to simultaneously analyse the expression levels of large numbers of polynucleotides. Two microarray technologies for mRNA expression profiling (review: 'The Chipping Forecast', Supplement to *Nature Genetics*. 21: 1999) were used to investigate/analyse the expression profiles of the polynucleotides of the present invention, one supplied by Affymetrix and the other by Amersham/Molecular Dynamics. Together they offer greater flexibility to generate robust, reproducible and reliable data than either system in isolation.

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The Affymetrix technology, supplied by Affymetrix, U.S.A, comprises microarray chips of high-density oligonucleotides created using adapted photolithographic masking techniques (methodology is as described by the manufacturer; Lockhart, D.J. J. Expression monitoring by hybridisation to high-density oligonucleotide arrays. *Nature Biotechnology*. 14:1675-1680, 1996). A number of different overlapping oligonucleotide pairs corresponding to each polynucleotide sequence to be probed are designed and synthesised (one member of each pair is complementary

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to the oligonucleotide sequence of interest and the other, 'control sequence' of the pair includes a single mismatched base). The Affymetrix array system requires prior knowledge of at least a part of each of the nucleotide sequences which are to be attached to the chip to enable suitable probe pairs to be designed and synthesised. This system enables genes of very high homology to be distinguished from one another. This system is very accurate and enables the expression of a large number of genes to be analysed in a single hybridisation reaction. However, once a microarray has been designed and constructed the photolithography process does not allow changes in the nucleotide sequence of the oligonucleotide probes fixed to the array to be made. Accordingly, a new microarray must be designed and synthesised to probe a different set of genes. The array is exposed to labelled cDNA or cRNA from a variety of sources (as described above) under conditions which favour hybridisation. Hybridisation patterns indicate the identity of and the quantity of expression.

The Amersham Pharmacia Biotechnology/Molecular Dynamics system involves robotically spotting up to 10,000 polynucleotide sequences, normally generated by PCR, onto specially prepared glass slides. It is not necessary to know the nucleotide sequence of the sequences before they are applied to the array. The slide is exposed to fluorescently labelled nucleic acid samples under conditions which favour hybridisation [see Schena, M et al. Quantitative monitoring of gene expression patterns with a complementary DNA microarray. *Science* 270, 467-470 (1995)]. Hybridisation patterns indicate the identity and the quantity of expression. These microarrays are very flexible and the target fragments applied to the slide can be easily changed. They can be used to determine the differential expression of large numbers of genes, although it is not suitable for those that have high levels of homology to one another.

Several different biological approaches were combined to form an integrated strategy. In the first approach, purified peripheral blood eosinophils were studied from clinically defined normal individuals (e.g. skin test, FEV1, and IgE levels within predefined parameters) and staged asthmatics (e.g. mild, moderate and severe; different values were set for these parameters).

mRNA was isolated from the eosinophils and used to prepare a cDNA library. The mRNA from a number of individuals was pooled to maximise the representation of genes that could be expressed by an eosinophil in different circumstances. A cDNA library was constructed with an average fragment size of 500-1000 base pairs. The library was designed so that the inserts could be amplified by PCR in a highly uniform process using generic vector-derived primers, to provide DNA fragments that could be directly spotted onto microarrays. Clones from these

libraries were subjected to high throughput sequencing to confirm the diversity of the library and identify novel sequences.

5 Identification of the full-length sequences can be performed using in a number of different methods. For example, the gene can be isolated from a corresponding full-length eosinophil library or a library from a commercial source. Direct cloning from mRNA using a variety of techniques such as "5' race" is also possible.

10 Microarrays were generated using the library clones or the information derived from their sequence. The microarrays were used to generate differential mRNA expression data for eosinophils isolated from different sources or under the different conditions as described above (e.g. disease and normal or with and without treatment of IL-5) or for comparison of eosinophil mRNA with mRNA isolated from other cell types.

15 Variation was normalised to allow comparison of data from different microarrays by empirical selection of invariant genes followed by normalisation across this set. Although this approach was found to provide the most reliable and accurate data a variety of alternative normalisation methods could be envisaged by the skilled man, including global normalisation across the whole array, incorporation of a known mRNA or 'spike' as an internal standard in each sample, or
20 normalisation to a housekeeping gene or genes (e.g. GAPDH, actin).

It is apparent that the polynucleotides or fragments thereof of the second aspect of the invention may be utilised in the above described methodology, for the identification of further polynucleotides and polypeptides which play a role in eosinophil mediated disease, such as
25 inflammatory disease.

In a third aspect, the present invention relates to polynucleotide sequences that are capable of hybridising to any of the polynucleotide sequences which encode amino-acid sequences encoded by Seq ID Nos: 1-466 or to any of Seq ID Nos: 1-466 themselves, under stringent conditions, as
30 defined above. In a preferred embodiment of the third aspect, there is provided polynucleotide sequences which are complimentary to the polynucleotide sequences which encode amino-acid sequences encoded by Seq ID Nos: 1-466, such as sequences which are complementary to any of Seq ID Nos: 1-466.

35 Although the nucleotide sequences of the third aspect are capable of hybridising to the naturally occurring polynucleotide sequences under stringent conditions as described above, included

within the scope of the third aspect are polynucleotide sequences which hybridise to polynucleotide sequences having different codon usage, as a result of the degeneracy of the genetic code.

5 The polynucleotide sequences according to the third aspect of the invention are useful in antisense technology, for example in the modulation and/or suppression of polynucleotide expression by interfering with the proper transcription or translation of the polynucleotide sequence. This modulation and/or suppression of polynucleotide expression may be useful in abolishing or alleviating disease symptoms associated with the polynucleotide sequences. In a
10 preferred embodiment, the third aspect relates to a method of modulating or suppressing expression of a polynucleotide sequence which encodes an amino-acid sequence encoded by any of Seq ID Nos: 1-466 or fragments of those amino acid sequences, by administering a polynucleotide sequence, or fragment thereof, which hybridises under stringent conditions to the polynucleotide sequence being expressed.

15 Such methods which suppress expression of the polynucleotide sequences may be used to elaborate on the functional properties of the polynucleotide sequences and their expression products. For example, cellular assays may be conducted in which key eosinophil responses are measured in response to normal and suppressed polynucleotide expression. The methods may
20 also be used to abolish or alleviate the symptoms or cause of disease in a subject. In such a method, a polynucleotide sequence or fragment thereof according to the third aspect of the invention may be administered to a subject. Two distinct 'antisense' methodologies are favoured. In one preferred method polynucleotides of approximately 20 bases complementary to the mRNA coding sequence are used to disable the gene of interest. In the other preferred
25 'antisense' methodology, the whole or a fragment of the gene sequence is inserted into an expression vector in an antisense orientation (3' to 5') under the control of a mammalian promoter and/or enhancer sequence.

For the first of the above methods, numerous techniques are available which assist in the design
30 of suitable antisense oligonucleotides including, for example, the determination of loops in the mRNA structure using software based on thermodynamic stability calculations of the secondary and/or tertiary mRNA structures, RNase H mapping of open sites using semi-random oligonucleotides and oligonucleotides designed to bind at defined intervals along the mRNA sequence. An electronic mapping procedures based on the mFold programme may be used to
35 generate a short list of antisense oligonucleotides. The oligonucleotides may then tested in cellular assays to select potent and specific antisense oligonucleotides that suppress expression of

polynucleotide sequences, preferably by suppressing levels of the transcribed mRNA, prior to their use in functional assays or therapeutic methods described above.

Antisense oligonucleotides can be modified in a variety of ways, including the use of methyl
5 phosphonate, methoxy-,ethoxy- or other base modifications and phosphorothioate to increased stability, cellular uptake, mRNA affinity and decreased non-specific protein or mRNA/DNA binding affinity, whilst maintaining their ability to induce RNase H cleavage or block transcription/translation. In addition to identifying a potent and specific antisense oligonucleotide, the antisense oligonucleotide must be effectively delivered to the cell of interest.
10 Preferably, the antisense oligonucleotide is produced by PCR techniques.

Using the second preferred 'antisense' methodology involves inserting the whole or a fragment of the polynucleotide sequence into an expression vector in an antisense orientation (3' to 5') under the control of a promoter and/or enhancer sequence. Introduction of this sequence into the cell
15 of interest and transcription of the antisense mRNA is expected to reduce the quantity of mRNA available for translation, thus reducing the level of polypeptide expressed by the polynucleotide sequence. The antisense sequence can be introduced into a variety of different vectors (e.g. plasmid vectors, adenoviral and retroviral vectors) for delivery into cells prior to performing functional cellular assays.

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Retroviral vectors are preferred as they have a number of advantages over the other delivery systems including ease of construction, high transduction and expression efficiencies, integration of the expression cassette into the host chromosome and the ability to deliver to both dividing and non-dividing cells). Retroviral vectors based on moloney monkey leukaemia virus (MMLV)
25 enable delivery to a variety of dividing human cells by virtue of being pseudotyped with different envelope proteins (e.g. VSV-G and amphotropic MLV envelope). A commercial retroviral vector system comprising murine leukemia virus (MuLV) was also used. Replication deficient vectors based on lentiviruses such as human immunodeficiency virus (HIV), feline immunodeficiency virus (FIV) or equine immunodeficiency virus (EIAV), if pseudotyped with
30 appropriate envelope proteins, offer the potential of delivering to non-dividing or terminally differentiated cells, for example eosinophils.

In addition to the expression of antisense RNA, the retroviral vectors provide an ideal vehicle for the delivery of full length or fragments of the polynucleotide sequences in a sense orientation.
35 Full length expression provides evidence for the role of the target, particularly relevant if it were found to be 'up' regulated in disease. Whilst expression of a fragment of the sequence could

result in the production of a dominant negative protein or provide information regarding a possible splice variant of the gene.

For both antisense methodologies and the over expression studies, it is essential that mRNA
5 levels of the target and control polynucleotide sequences are measured accurately to ensure specificity and validity. PCR based methods are preferred because of their sensitivity of detection particularly following mRNA antisense suppression. A variety of PCR based techniques are available including gel based quantitative or semi-quantitative methods and densitometric measurement, in solution based methods using DNA intercalating fluorescent
10 dyes or hybridisation of complementary labelled polynucleotides, the Taqman system from Perkin Elmer is preferred as this system offers good reproducibility, accuracy, real time quantitation and relatively high through put.

In a preferred embodiment of the second or third aspects of the invention, the polynucleotide
15 sequences may be ligated to a heterologous sequence to encode a fusion protein. For example, to screen peptide libraries for inhibitors, it may be useful to encode a chimeric protein that can be recognised by a commercially available antibody. A fusion protein may also be engineered to contain a cleavage site located between the sequence encoding the peptide of interest and the heterologous protein sequence, so that the peptide of interest may be cleaved and purified away
20 from the heterologous moiety.

The polynucleotide sequences of the second and third aspects of the invention may be operably linked to any regulatory region, *i.e.*, promoter and/or enhancer element known in the art, but these regulatory elements must be functional in the host cell selected for expression. The
25 regulatory regions may comprise a promoter region for functional transcription in the host cell, and optionally a region situated 3' of the gene of interest, and which specifies a signal for termination of transcription and a polyadenylation site. A replication origin may also be included. Polynucleotide sequences of this embodiment may be referred to as expression cassettes. Promoters that may be used in the present invention include both constitutive
30 promoters and regulated (inducible) promoters. The promoter may one which naturally controls the expression of the polynucleotide sequence, or where the polynucleotide sequence is in an antisense configuration, the promoter is one which naturally controls the expression of the sense configuration of the polynucleotide sequence. When the nucleic acid does not contain a promoter sequence, an appropriate promoter sequence may be inserted.

Promoters may be from a heterologous source. In particular, they may be promoter sequences of eukaryotic or viral genes. For example, a promoter sequence may be derived from the genome of the host cell which is to be infected. Likewise, promoter sequences may be derived from the genome of a virus, such as adenovirus (E1A and MLP), cytomegalovirus, or Rous Sarcoma Virus. In addition, the promoter may be modified by addition of activating or regulatory sequences, or sequences which confer a specific expression pattern, for example tissue-specific or predominant expression (enolase and GFAP promoters etc.). Such promoters would be known to a person skilled in the art.

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Suitable promoters useful for practice of this invention include ubiquitous promoters (*e.g.*, HPRT, vimentin, actin, tubulin), intermediate filament promoters (*e.g.*, desmin, neurofilaments, keratin, GFAP), therapeutic gene promoters (*e.g.*, MDR type, CFTR, factor VIII), tissue-specific promoters (*e.g.*, actin promoter in smooth muscle cells), promoters which are preferentially activated in dividing cells, promoters which respond to a stimulus (*e.g.*, steroid hormone receptor, retinoic acid receptor), tetracycline-regulated transcriptional modulators, cytomegalovirus (CMV) immediate-early, retroviral LTR, metallothionein, SV-40, adenovirus E1a, and adenovirus major late (MLP) promoters. Tetracycline-regulated transcriptional modulators and CMV promoters are described in WO 96/01313, US 5,168,062 and 5,385,839, the contents of which are incorporated herein by reference. Further preferred promoters include, but are not limited to, the SV40 early promoter region (Benoist and Chambon, 1981, Nature 290:304-310), the promoter contained in the 3' long terminal repeat of Rous sarcoma virus (Yamamoto, et al., 1980, Cell 22:787-797), the herpes thymidine kinase promoter (Wagner et al., 1981, Proc. Natl. Acad. Sci. U.S.A. 78:1441-1445), the regulatory sequences of the metallothionein gene (Brinster et al., 1982, Nature 296:39-42); prokaryotic expression vectors such as the β -lactamase promoter (Villa-Kamaroff, et al., 1978, Proc. Natl. Acad. Sci. U.S.A. 75:3727-3731), or the *tac* promoter (DeBoer, et al., 1983, Proc. Natl. Acad. Sci. U.S.A. 80:21-25); see also "Useful proteins from recombinant bacteria" in Scientific American, 1980, 242:74-94; promoter elements from yeast or other fungi such as the Gal 4 promoter, the ADC (alcohol dehydrogenase) promoter, PGK (phosphoglycerol kinase) promoter, alkaline phosphatase promoter; and the animal transcriptional control regions, which exhibit tissue specificity and have been utilized in transgenic animals: elastase I gene control region which is active in pancreatic acinar cells (Swift et al., 1984, Cell 38:639-646; Ornitz et al., 1986, Cold Spring Harbor Symp. Quant. Biol. 50:399-409; MacDonald, 1987, Hepatology 7:425-515); insulin gene control region which is active in pancreatic beta cells (Hanahan, 1985, Nature 315:115-122), immunoglobulin gene control region which is active in lymphoid cells (Grosschedl et al., 1984, Cell 38:647-658; Adames et al., 1985,

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Nature 318:533-538; Alexander et al., 1987, Mol. Cell. Biol. 7:1436-1444), mouse mammary tumour virus control region which is active in testicular, breast, lymphoid and mast cells (Leder et al., 1986, Cell 45:485-495), albumin gene control region which is active in liver (Pinkert et al., 1987, Genes and Devel. 1:268-276), alpha-fetoprotein gene control region which is active in liver
5 (Krumlauf et al., 1985, Mol. Cell. Biol. 5:1639-1648; Hammer et al., 1987, Science 235:53-58), alpha 1-antitrypsin gene control region which is active in the liver (Kelsey et al., 1987, Genes and Devel. 1:161-171), beta-globin gene control region which is active in myeloid cells (Mogam et al., 1985, Nature 315:338-340; Kollias et al., 1986, Cell 46:89-94), myelin basic protein gene control region which is active in oligodendrocyte cells in the brain (Readhead et al., 1987, Cell 48:703-
10 712), myosin light chain-2 gene control region which is active in skeletal muscle (Sani, 1985, Nature 314:283-286), and gonadotropic releasing hormone gene control region which is active in the hypothalamus (Mason et al., 1986, Science 234:1372-1378).

Additional regulatory regions may be identified using the polynucleotides of the present
15 invention. The polynucleotide sequence may be extended using various methods known in the art to detect upstream sequences such as promoters and regulatory elements. One such method which may be employed is restriction-site PCR which uses universal primers to retrieve unknown sequence adjacent to a known locus (see, e.g., Sarkar, G. (1993) PCR Methods Applic. 2:318-322). In particular, genomic DNA is first amplified in the presence of a primer which is
20 complementary to a linker sequence within the vector and a primer specific to a region of the nucleotide sequence. The amplified sequences are then subjected to a second round of PCR with the same linker primer and another specific primer internal to the first one. Products of each round of PCR are transcribed with an appropriate RNA polymerase and sequenced using reverse transcriptase.

25
The polynucleotide sequences of the second and third aspects of the invention may also be operably linked to a 3' regulatory region, for example a 3' UTR sequence, or downstream promoter and/or enhancer sequences. Downstream 3' untranslated regions (3'UTR) have a well recognised role in mRNA stability (*Nucleic Acids Symp Ser* 1997;(36):29-32, *Microbiol Rev* 1995
30 Sep;59(3):423-50). The stability of an mRNA plays a major role in the determination of gene expression. The stability of an mRNA reflects its structure, as well as its interaction with trans-acting RNA-binding proteins. The processes that regulate mRNA stability can effect how cells grow, differentiate, and respond to their environment, and as such represent potential sites for therapeutic intervention. The polynucleotides of the present invention may be used to identify
35 novel 3' UTR's, which may be useful in the isolation of further full length cDNA clones, which may have a role in inflammatory disease. This may be done using standard methodologies

including: electronic extension by comparison with DNA databases, PCR based strategies such as RACE, and screening of cDNA libraries. 3' UTR's also have utility as electronic probes and can be used as probes to measure corresponding gene specific mRNA levels in cells or tissues, using a number of techniques well known in the art for example: RT-PCR, In-situ hybridisation,
5 Northern blotting, and microarray based techniques. This may be useful in diagnostic or prognostic assays, or functional assays. Finally, such 3' UTR's may be useful in the design of antisense oligonucleotides, which have a range of utilities as discussed above.

Upstream or downstream regulatory regions of the polynucleotide sequences of the second aspect
10 of the invention may be identified using inverse PCR, to amplify or extend sequences using divergent primers based on a known region. (See, e.g., Triglia, T. et al. (1988) Nucleic Acids Res. 16:8186.) The primers may be designed using commercially available software such as OLIGO 4.06 Primer Analysis software (National Biosciences Inc., Plymouth, MN) or another appropriate program to be about 22 to 30 nucleotides in length, to have a GC content of about 50% or more,
15 and to anneal to the target sequence at temperatures of about 68°C to 72°C. The method uses several restriction enzymes to generate a suitable fragment in the known region of a gene. The fragment is then circularised by intramolecular ligation and used as a PCR template. Another method which may be used is capture PCR, which involves PCR amplification of DNA fragments adjacent to a known sequence in human and yeast artificial chromosome DNA (See,
20 eg Lagerstrom, M. et al (1991) PCR Methods Applic. 1:111-119). In this method multiple restriction enzyme digestions and ligations may be used to place an engineered double-stranded sequence into an unknown fragment of the DNA molecule before performing PCR. Other methods which may be used to retrieve unknown sequences are well known in the art (see eg Parker, J.D. et al (1991) Nucleic Acids Res. 19:3055-3060). Additionally, one may use PCR,
25 nested primers and PromoterFinder™ libraries to walk genomic DNA (Clontech, Palo Alto, CA). This process avoids the need to screen libraries and is useful in finding intron/exon junctions.

When screening for full-length cDNAs, it is preferable to use libraries that have been size-selected to include larger cDNAs. Also, random-primed libraries are preferable in that they will
30 include more sequences which contain the 5' regions of genes. Use of a randomly primed library may be especially preferable for situations in which an oligo d(T) library does not yield a full-length cDNA. Genomic libraries may be useful for extension of sequence into 5' non-transcribed regulatory regions.

35 Capillary electrophoresis systems which are commercially available may be used to analyse the size or confirm the nucleotide sequence of sequencing or PCR products. In particular, the

capillary sequencing may employ flowable polymers for electrophoretic separation, four different fluorescent dyes (one for each nucleotide) which are laser activated, and a charge coupled device camera for detection of the emitted wavelengths. Output/light intensity may be converted to electrical signal using appropriate software (eg Genotyper™ and Sequence Navigator™, Perkin Elmer) and the entire process from loading of samples to computer analysis and electronic data display may be computer controlled. Capillary electrophoresis is especially preferable for sequencing small pieces of DNA which might be present in limited amounts in a particular sample.

10 In a further preferred embodiment of the second and third aspects of the present invention, the polynucleotide sequences may be engineered using methods generally known in the art in order to alter the sequences for a variety of reasons including, but not limited to, alterations which modify the cloning, processing, and/or expression of the gene product. DNA shuffling by random fragmentation and PCR reassembly of gene fragments and synthetic oligonucleotides may be
15 used to engineer the nucleotide sequences. For example, site-directed mutagenesis may be used to insert new restriction sites, alter glycosylation patterns, change codon preference, produce splice variants, introduce mutations, and so forth. Further, as will be understood by those of skill in the art, it may be advantageous to produce nucleotide sequences possessing non-naturally occurring codons. For example codons preferred by a particular prokaryotic or eukaryotic host
20 can be selected to increase the rate of protein expression or to produce RNA transcript having desirable properties such as a half-life which is longer than that of a transcript generated from the naturally occurring sequence.

In another preferred embodiment of the second and third aspects of the present invention, there is provided an expression vector comprising one or more polynucleotide sequences according to
25 the second or third aspects of the invention. As will be apparent to a person skilled in the art, the choice of expression vector may depend upon the characteristics of the polynucleotide sequence to be expressed and the expression system used. Useful expression vectors, for example, may consist of segments of chromosomal, non-chromosomal and synthetic DNA sequences. Suitable vectors include derivatives of SV40 and known bacterial plasmids, e.g., *E. coli* plasmids col E1, pCR1, pBR322, pMal-C2, pET, pGEX (Smith *et al.*, 1988, *Gene* 67:31-40), pMB9 and their
30 derivatives, plasmids such as RP4; phage DNAs, e.g., the numerous derivatives of phage λ , e.g., NM989, and other phage DNA, e.g., M13 and filamentous single stranded phage DNA; yeast plasmids such as the 2 μ plasmid or derivatives thereof; vectors useful in eukaryotic cells, such as vectors useful in insect or mammalian cells; vectors derived from combinations of plasmids and
35 phage DNAs, such as plasmids that have been modified to employ phage DNA or other expression control sequences; and the like.

For example, in a baculovirus expression systems, both non-fusion transfer vectors, such as but not limited to pVL941 (*Bam*H1 cloning site; Summers), pVL1393 (*Bam*H1, *Sma*I, *Xba*I, *Eco*RI, *Not*I, *Xma*III, *Bgl*II, and *Pst*I cloning site; Invitrogen), pVL1392 (*Bgl*II, *Pst*I, *Not*I, *Xma*III, *Eco*RI, *Xba*I, *Sma*I, and *Bam*H1 cloning site; Summers and Invitrogen), and pBlueBacIII (*Bam*H1, *Bgl*II, *Pst*I, *Nco*I, and *Hind*III cloning site, with blue/white recombinant screening possible; Invitrogen), and fusion transfer vectors, such as but not limited to pAc700 (*Bam*H1 and *Kpn*I cloning site, in which the *Bam*H1 recognition site begins with the initiation codon; Summers), pAc701 and pAc702 (same as pAc700, with different reading frames), pAc360 (*Bam*H1 cloning site 36 base pairs downstream of a polyhedrin initiation codon; Invitrogen(195)), and pBlueBacHisA, B, C (three different reading frames, with *Bam*H1, *Bgl*II, *Pst*I, *Nco*I, and *Hind*III cloning site, an N-terminal peptide for ProBond purification, and blue/white recombinant screening of plaques; Invitrogen (220)) can be used.

Mammalian expression vectors contemplated for use in the invention include vectors with inducible promoters, such as the dihydrofolate reductase (*DHFR*) promoter, *e.g.*, any expression vector with a *DHFR* expression vector, or a *DHFR*/methotrexate co-amplification vector, such as pED (*Pst*I, *Sal*I, *Sba*I, *Sma*I, and *Eco*RI cloning site, with the vector expressing both the cloned gene and *DHFR*; see Kaufman, *Current Protocols in Molecular Biology*, 16.12 (1991). Alternatively, a glutamine synthetase/methionine sulfoximine co-amplification vector, such as pEE14 (*Hind*III, *Xba*I, *Sma*I, *Sba*I, *Eco*RI, and *Bcl*I cloning site, in which the vector expresses glutamine synthase and the cloned gene; Celltech). In another embodiment, a vector that directs episomal expression under control of Epstein Barr Virus (EBV) can be used, such as pREP4 (*Bam*H1, *Sfi*I, *Xho*I, *Not*I, *Nhe*I, *Hind*III, *Nhe*I, *Pvu*II, and *Kpn*I cloning site, constitutive Rous Sarcoma Virus Long Terminal Repeat (RSV-LTR) promoter, hygromycin selectable marker; Invitrogen), pCEP4 (*Bam*H1, *Sfi*I, *Xho*I, *Not*I, *Nhe*I, *Hind*III, *Nhe*I, *Pvu*II, and *Kpn*I cloning site, constitutive human cytomegalovirus (hCMV) immediate early gene, hygromycin selectable marker; Invitrogen), pMEP4 (*Kpn*I, *Pvu*I, *Nhe*I, *Hind*III, *Not*I, *Xho*I, *Sfi*I, *Bam*H1 cloning site, inducible methallothionein IIa gene promoter, hygromycin selectable marker; Invitrogen), pREP8 (*Bam*H1, *Xho*I, *Not*I, *Hind*III, *Nhe*I, and *Kpn*I cloning site, RSV-LTR promoter, histidinol selectable marker; Invitrogen), pREP9 (*Kpn*I, *Nhe*I, *Hind*III, *Not*I, *Xho*I, *Sfi*I, and *Bam*H1 cloning site, RSV-LTR promoter, G418 selectable marker; Invitrogen), and pEBVHis (RSV-LTR promoter, hygromycin selectable marker, N-terminal peptide purifiable via ProBond resin and cleaved by enterokinase; Invitrogen). Selectable mammalian expression vectors for use in the invention include pRc/CMV (*Hind*III, *Bst*XI, *Not*I, *Sba*I, and *Apa*I cloning site, G418 selection; Invitrogen), pRc/RSV (*Hind*III, *Spe*I, *Bst*XI, *Not*I, *Xba*I cloning site, G418 selection; Invitrogen),

and others. Vaccinia virus mammalian expression vectors (*see*, Kaufman, 1991, *supra*) for use according to the invention include but are not limited to pSC11 (*Sma*I cloning site, TK- and β -gal selection), pMJ601 (*Sa*II, *Sma*I, *Af*II, *Nar*I, *Bsp*MI, *Bam*HI, *Apa*I, *Nhe*I, *Sac*II, *Kpn*I, and *Hind*III cloning site; TK- and β -gal selection), and pTKgptF1S (*Eco*RI, *Pst*I, *Sa*II, *Acc*I, *Hind*II, *Sba*I, *Bam*HI, and *Hpa*I cloning site, TK or XPRT selection).

In another preferred embodiment, there are provided host cells comprising the polypeptide or polynucleotide sequences according to the first, second or third aspects of the invention. Preferably, a host cell is provided as an expression system, and thus may comprise a polynucleotide sequence or fragment thereof according to the second or third aspects of the invention. More preferably, the host cell will comprise an expression vector, such as described above, which comprises the polynucleotide sequence or fragment thereof. Suitable host cell strains or cell-free expression systems will be known to persons skilled in the art.

A host cell strain may be chosen which modulates the expression of the inserted sequences, or modifies and processes the gene product in the specific fashion desired. Different host cells have characteristic and specific mechanisms for the translational and post-translational processing and modification of proteins. Appropriate cell lines or host systems can be chosen to ensure the desired modification and processing of the foreign protein expressed. Expression in yeast can produce a biologically active product. Expression in eukaryotic cells can increase the likelihood of "native" folding. Moreover, expression in mammalian cells can provide a tool for reconstituting, or constituting, polypeptide activity. Furthermore, different vector/host expression systems may affect processing reactions, such as proteolytic cleavages, to a different extent.

In a fourth aspect, the present invention relates to the production of the polynucleotide or polypeptide sequences, or fragments or variants thereof, according to the first, second or third aspects of the invention. The production of a polynucleotide or polypeptide sequence may comprise either recombinant or synthetic techniques. Where the method comprises production of the polypeptide or polynucleotide sequence by synthetic chemistry, preferably the entire polypeptide or polynucleotide sequence, or desired fragment thereof is made using synthetic chemistry. Where a polynucleotide is produced, the synthetic sequence may be inserted into any expression vectors, such as those described above, and expressed in a expression system using reagents that are well known in the art. Moreover synthetic chemistry may be used to introduce modifications and/or mutations into an oligonucleotide sequence or a fragment thereof.

The polynucleotide sequences may be synthesised, in whole or in part, using chemical methods well known in the art. (See, e.g., Caruthers, M.H. et al. (1980) Nucl. Acids Res. Symp. Ser. 215-223, and Horn, T. et al. (1980) Nucl. Acids Res. Symp. Ser. 225-232). Alternatively, the polypeptide may be produced using chemical methods to synthesize the amino acid sequence of any one or more of Figure 1 to 357, or a fragment thereof. For example, peptide synthesis can be performed using various solid-phase techniques. (See, e.g., Roberge, J.Y. et al. (1995) Science 269:202-204). Automated synthesis may be achieved using the ABI 43 IA Peptide Synthesizer (Perkin Elmer). Additionally, the amino acid sequence, or any part thereof, may be altered during direct synthesis and/or combined with sequences from other proteins, or any part thereof, to produce a variant polypeptide. The polypeptide may be substantially purified by preparative high performance liquid analysis or by sequencing. (See for example: Creighton, T. (1983) Proteins. Structures and Molecular Properties, WH Freeman and Co., New York).

In a preferred embodiment of the fourth aspect of the invention, there is provided a method for directing the expression of the polypeptide sequences or fragments thereof of the first aspect of the invention in appropriate host cells. Preferably, this method employs recombinant DNA technology to result in expression of polypeptides according to the first aspect of the invention. The method of producing a polypeptide according to the first aspect of the invention, comprises:

- a) transforming a host cell with a polynucleotide sequence according to the second or third aspects of the invention;
- b) culturing the host cell under conditions suitable for expression of the polypeptide; and
- c) recovering the polypeptide from the host cell culture.

The polynucleotide sequence introduced into the host cell may be in the form of an expression vector, having the necessary regulatory sequences such as promoters and/or enhancers, and transcriptional and translational signals, as discussed above. The polynucleotide sequence may be flanked by its' native upstream and/or downstream regulatory regions. Potential host-vector systems include but are not limited to mammalian cell systems infected with virus (e.g., vaccinia virus, adenovirus, etc.); insect cell systems infected with virus (e.g., baculovirus); microorganisms such as yeast containing yeast vectors; or bacteria transformed with bacteriophage, DNA, plasmid DNA, or cosmid DNA. The expression elements of vectors vary in their strengths and specificities. Depending on the host-vector system utilised, any one of a number of suitable transcription and translation elements may be used. Yeast expression systems can also be used to express polypeptides of the present invention. For example, the non-fusion pYES2 vector (*Xba*I, *Sph*I, *Sho*I, *Not*I, *Gst*XI, *Eco*RI, *Bst*XI, *Bam*HI, *Sac*I, *Kpn*I, and *Hind*III cloning sit; Invitrogen) or the fusion pYESHisA, B, C (*Xba*I, *Sph*I, *Sho*I, *Not*I, *Bst*XI, *Eco*RI,

*Bam*H1, *Sac*I, *Kpn*I, and *Hind*III cloning site, N-terminal peptide purified with ProBond resin and cleaved with enterokinase; Invitrogen), to mention just two, can be employed according to the invention.

5 Alternatively, the polynucleotide sequence of the invention or fragment thereof, may be expressed chromosomally, after integration of the coding sequence by recombination. In this regard, any of a number of amplification systems may be used to achieve high levels of stable gene expression (*See* Sambrook et al., 1989, *supra*). Any method for the insertion of DNA fragments into a cloning vector may be used to construct expression vectors containing a gene
10 consisting of appropriate transcriptional/translational control signals and the protein coding sequences. These methods may include *in vitro* recombinant DNA and synthetic techniques and *in vivo* recombination (genetic recombination). Such methods will be known to a person skilled in the art.

15 Vectors are introduced into the desired host cells by methods known in the art, *e.g.*, transfection, electroporation, microinjection, transduction, cell fusion, DEAE dextran, calcium phosphate precipitation, lipofection (lysosome fusion), use of a gene gun, or a DNA vector transporter (*see, e.g.*, Wu et al., 1992, J. Biol. Chem. 267:963-967; Wu and Wu, 1988, J. Biol. Chem. 263:14621-14624; Hartmut et al., Canadian Patent Application No. 2,012,311, filed March 15, 1990).

20 Expression vectors containing a polynucleotide of the invention can be identified by five general approaches: (a) PCR amplification of the desired plasmid DNA or specific mRNA, (b) nucleic acid hybridization, (c) presence or absence of selection marker gene functions, (d) analysis with appropriate restriction endonucleases, and (e) expression of inserted sequences. In the first
25 approach, the nucleic acids can be amplified by PCR to provide for detection of the amplified product. In the second approach, the presence of a foreign gene inserted in an expression vector can be detected by nucleic acid hybridization using probes comprising sequences that are homologous to an inserted marker gene. In the third approach, the recombinant vector/host system can be identified and selected based upon the presence or absence of certain "selection
30 marker" gene functions (*e.g.*, β -galactosidase activity, thymidine kinase activity, resistance to antibiotics, transformation phenotype, occlusion body formation in baculovirus, etc.) caused by the insertion of foreign genes in the vector. In another example, if a polynucleotide sequence of the invention is inserted within a "selection marker" gene sequence of the vector. Recombinants containing an insert can then be identified by the absence of the gene function. In the fourth
35 approach, recombinant expression vectors are identified by digestion with appropriate restriction enzymes. In the fifth approach, recombinant expression vectors can be identified by

assaying for the activity, biochemical, or immunological characteristics of the gene product expressed by the recombinant, provided that the expressed protein assumes a functionally active conformation.

- 5 Once a particular recombinant DNA molecule is identified and isolated, several methods known in the art may be used to propagate it. Once a suitable host system and growth conditions are established, recombinant expression vectors can be propagated and prepared in quantity.

10 Soluble forms of the protein can be obtained by collecting culture fluid, or solubilising inclusion bodies, *e.g.*, by treatment with detergent, and if desired sonication or other mechanical processes, as described above. The solubilised or soluble protein can be isolated using various techniques, such as polyacrylamide gel electrophoresis (PAGE), isoelectric focusing, 2-dimensional gel electrophoresis, chromatography (*e.g.*, ion exchange, affinity, immunoaffinity, and sizing column chromatography), centrifugation, differential solubility, immunoprecipitation, or by any other
15 standard technique for the purification of proteins.

In accordance with the present invention there may be employed conventional molecular biology, microbiology, and recombinant DNA techniques within the skill of the art. Such techniques are explained fully in the literature. See, *e.g.*, Sambrook, Fritsch & Maniatis, *Molecular Cloning: A Laboratory Manual*, Second Edition (1989) Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York ; *DNA Cloning: A Practical Approach*, Volumes I and II (D.N. Glover ed. 1985); *Oligonucleotide Synthesis* (M.J. Gait ed. 1984); *Nucleic Acid Hybridization* [B.D. Hames & S.J. Higgins eds. (1985)]; *Transcription And Translation* [B.D. Hames & S.J. Higgins, eds. (1984)]; *Animal Cell Culture* [R.I. Freshney, ed. (1986)]; *Immobilized Cells And Enzymes* [IRL Press, (1986)]; B. Perbal, *A Practical Guide To Molecular Cloning* (1984); F.M. Ausubel et al. (eds.), *Current Protocols in Molecular Biology*, John Wiley & Sons, Inc. (1994).
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Methods for DNA sequencing are well known and generally available in the art and may be used to practice any of the embodiments of the invention. The methods may employ such enzymes as
30 the Klenow fragment of DNA polymerase I, TM (US Biochemical Corp., Cleveland, OH), Taq polymerase (Perkin Elmer), thermostable T7 polymerase (Amersham, Chicago, IL), or combinations of polymerases and proof reading exonucleases such as those found in the ELONGASE Amplification System (GIBCO/BRL, Gaithersburg, MD). Preferably, the process is automated with machines.

In a fifth aspect of the invention, there is provided an antibody or fragment thereof which binds to a polypeptide according to the first aspect of the invention. Also provided are methods for production of such antibodies or fragments thereof, using the polypeptides, or fragments thereof, of the first aspect as antigens. Fusion proteins as described above may also be used for the generation of antibodies.

A molecule is "antigenic" when it is capable of specifically interacting with an antigen recognition molecule of the immune system, such as an immunoglobulin (antibody) or T cell antigen receptor. An antigenic polypeptide contains at least about 5, and preferably at least about 10, amino acids. An antigenic portion of a molecule can be that portion that is immunodominant for antibody or T cell receptor recognition, or it can be a portion used to generate an antibody to the molecule by conjugating the antigenic portion to a carrier molecule for immunisation. A molecule that is antigenic need not be itself immunogenic, *i.e.*, capable of eliciting an immune response without a carrier.

The antibodies of the fifth aspect include but are not limited to polyclonal, monoclonal, chimeric, single chain, Fab fragments, and an Fab expression library. The antibodies of the invention may be cross reactive, *ie* they may recognise different antigenic species. Polyclonal antibodies have greater likelihood of cross reactivity. Alternatively, an antibody of the invention may be specific for a single polypeptide. Preferably, such an antibody is specific for the polypeptides of the invention.

Various procedures known in the art may be used for the production of polyclonal antibodies. For the production of antibody, various host animals can be immunised by injection with a polypeptide of the invention, or a derivative (*e.g.*, fragment or fusion protein) thereof, including but not limited to rabbits, mice, rats, sheep, goats, etc. In one embodiment, a polypeptide or fragment thereof can be conjugated to an immunogenic carrier, *e.g.*, bovine serum albumin (BSA) or keyhole limpet hemocyanin (KLH). Various adjuvants may be used to increase the immunological response, depending on the host species, including but not limited to Freund's (complete and incomplete), mineral gels such as aluminium hydroxide, surface active substances such as -lysolecithin, pluronic polyols, polyanions, peptides, oil emulsions, keyhole limpet hemocyanins, dinitrophenol. Among adjuvants used in humans, BCG (bacilli Calmette-Guerin) and 5 Colynebacte arvum are especially preferable. It is preferred that the polypeptides, or fragments used to induce antibodies have an amino acid sequence consisting of at least about 5 amino acids, and, more preferably, of at least about 10 amino acids. It is also preferable that these polypeptides, or fragments are identical to a portion of the amino acid sequence of the

natural protein. Short stretches of amino acids may be fused with those of another protein, such as KLH and antibodies to the chimeric molecule may be produced.

Monoclonal antibodies directed towards a polypeptide of the invention, or fragment, or analog,
5 or derivative thereof may be prepared using any technique which provides for the production of antibody molecules by continuous cell lines in culture. These include, but are not limited to the hybridoma technique originally developed by Kohler and Milstein [*Nature* 256:495-497 (1975)], as well as the trioma technique, the human B-cell hybridoma technique [Kozbor et al., *Immunology Today* 4:72 1983]; Cote et al., *Proc. Natl. Acad. Sci. U.S.A.* 80:2026-2030 (1983)], and
10 the EBV-hybridoma technique to produce human monoclonal antibodies [Cole et al., in *Monoclonal Antibodies and Cancer Therapy*, Alan R. Liss, Inc., pp. 77-96 (1985)].

In another embodiment of the fifth aspect, monoclonal antibodies can be produced in germ-free animals [International Patent Publication No. WO 89/12690, published 28 December 1989].

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Techniques developed for the production of "chimeric antibodies" such as [Morrison et al., *J. Bacteriol.* 159:870 (1984); Neuberger et al., *Nature* 312:604-608 (1984); Takeda et al., *Nature* 314:452-454 (1985)] by splicing the genes from a mouse antibody molecule specific for a polypeptide of the invention together with genes from a human antibody molecule of appropriate
20 biological activity can also be used; and such antibodies are within the scope of this invention. Such human or humanized chimeric antibodies are preferred for use in therapy of human diseases or disorders (described *infra*), since the human or humanized antibodies are much less likely than xenogenic antibodies to induce an immune response, in particular an allergic response, themselves.

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According to the invention, techniques described for the production of single chain Fv (scFv) antibodies [U.S. Patent Nos. 5,476,786 and 5,132,405 to Huston; U.S. Patent 4,946,778] can be adapted to produce polypeptide-specific single chain antibodies.

30 An additional embodiment of the invention utilises the techniques described for the construction of Fab expression libraries Huse et al., *Science* 246:1275-1281 (1989) to allow rapid and easy identification of monoclonal Fab fragments with the desired specificity for a polypeptide of the invention, or its derivatives, or analogs. Antibody fragments which contain the idiotype of the antibody molecule can be generated by known techniques. For example, such fragments include
35 but are not limited to: the F(ab')₂ fragment which can be produced by pepsin digestion of the antibody molecule; the Fab' fragments which can be generated by reducing the disulfide bridges

of the F(ab')₂ fragment, and the Fab fragments which can be generated by treating the antibody molecule with papain and a reducing agent.

In the production of antibodies, screening for the desired antibody can be accomplished by techniques known in the art, *e.g.*, radioimmunoassay, ELISA (enzyme-linked immunosorbent assay), "sandwich" immunoassays, immunoradiometric assays, gel diffusion precipitation reactions, immunodiffusion assays, *in situ* immunoassays (using colloidal gold, enzyme or radioisotope labels, for example), western blots, precipitation reactions, agglutination assays (*e.g.*, gel agglutination assays, hemagglutination assays), complement fixation assays, immunofluorescence assays, protein A assays, and immunoelectrophoresis assays, etc. In one embodiment, antibody binding is detected by detecting a label on the primary antibody. In another embodiment, the primary antibody is detected by detecting binding of a secondary antibody or reagent to the primary antibody. In a further embodiment, the secondary antibody is labelled. Many means are known in the art for detecting binding in an immunoassay and are within the scope of the present invention. For example, to select antibodies which recognise a specific epitope of a polypeptide of the present invention, one may assay generated hybridomas for a product which binds to an polypeptide fragment containing such epitope. For selection of an antibody specific to a polypeptide from a particular species of animal, one can select on the basis of positive binding with polypeptide expressed by or isolated from cells of that species of animal.

20

The foregoing antibodies can be used in methods known in the art relating to the localisation and activity of the polypeptides of the present invention, *e.g.*, for Western blotting, imaging polypeptide *in situ*, measuring levels thereof in appropriate physiological samples, etc. using any of the detection techniques mentioned above or known in the art.

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In a specific embodiment, antibodies that agonize or antagonize the activity of a polypeptide can be generated. Such antibodies can be tested using the assays described *infra* for identifying ligands. In particular, such antibodies can be scFv antibodies expressed intracellularly.

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Histological analysis using these antibodies of the present invention can provide information on protein tissue distribution (disease and normal tissue), localisation of the protein within cells and the extracellular environment. The antibodies of the present invention can also provide functional information by acting as agonists or antagonists of the protein encoded by the novel gene in question both *in vitro* and *in vivo*.

In a sixth aspect, the present invention relates to a method of screening for agents which modify the expression and/or activity of one or more of the polynucleotides or polypeptides of the present invention, or derivatives thereof, the method comprising the steps of:

- 5 a) exposing one or more of the polynucleotides or polypeptides or derivatives thereof to at least one agent to be screened; and
- b) detecting and/or measuring interaction and/or binding between the polynucleotide or polypeptide or derivatives thereof and the agent.

10 Preferably, the polynucleotides are those of the second or third aspect of the invention, more preferably the polynucleotide sequences of any of Seq ID Nos: 1-466, or fragments thereof. The polypeptide sequences are preferably those encoded by any of Seq ID Nos: 1-466, or fragments thereof.

15 The polypeptides or polynucleotides of the present invention, or derivatives thereof including catalytic or immunogenic fragments, or oligopeptides can be used for screening libraries of compounds in any of a variety of drug screening techniques. The polypeptides or polynucleotides of the present invention, or derivatives thereof employed in such screening may be free in solution, affixed to a solid support, borne on a cell surface, or located intracellularly.

20 The formation of binding complexes between the polypeptides or polynucleotides of the present invention, or derivatives thereof and the agent being tested may be measured.

Another technique for drug screening provides for high throughput screening of compounds having suitable binding affinity to a polypeptide of interest. (See, e.g., Geysen, et al. (1984) PCT application W084103564). In this method, large numbers of different small test compounds are synthesised on a solid substrate, such as plastic pins or some other surface. The test compounds are reacted with a polypeptide of the present invention, or one or more fragments thereof, and washed. Bound polypeptide is then detected by methods well known in the art. Purified polypeptide can also be coated directly onto plates for use in the aforementioned drug screening techniques. Alternatively, non-neutralising antibodies can be used to capture the peptide and immobilise it on a solid support.

Identification and isolation of a polynucleotide encoding a polypeptide of the invention provides for expression of polypeptides in quantities greater than can be isolated from natural sources, or in indicator cells that are specially engineered to indicate the activity of a polypeptide expressed after transfection or transformation of the cells. Accordingly, in addition to rational design of agonists and antagonists based on the structure of a polypeptide, the present invention

contemplates an alternative method for identifying specific ligands of polypeptides of the invention using various screening assays known in the art.

Any screening technique known in the art can be used to screen for agents which either agonise
5 or antagonise the polypeptides of the present invention. For example, a suitable cell line expressing a polypeptide of the invention, can be transfected with a nucleic acid encoding a marker gene, such as β -galactosidase. Cells are then exposed to a test solution comprising a putative agonist or antagonist, and then stained for β -galactosidase activity. The presence of more β -gal positive cells relative to control cells not exposed to the test solution is an indication
10 of the presence of an agonist of the polypeptide in the test solution. Conversely, the presence of less β -gal positive cells relative to control cells not exposed to the test solution is an indication of the presence of an antagonist of the polypeptide in the test solution.

The present invention contemplates screens for small molecule ligands or ligand analogs and
15 mimics, as well as screens for natural ligands that bind to and agonise or antagonise the polypeptides or polynucleotides of the present invention *in vivo*.

Knowledge of the primary sequence of a polynucleotide or polypeptide of the invention, and the similarity of that sequence with sequences of known function, can provide an indication of
20 potential inhibitors or antagonists of a protein or polynucleotide. Identification and screening of antagonists is further facilitated by determining structural features of the polynucleotide or polypeptide, *e.g.*, using X-ray crystallography, neutron diffraction, nuclear magnetic resonance spectrometry, and other techniques for structure determination. These techniques provide for the rational design or identification of agonists and antagonists.

25 Another approach uses recombinant bacteriophage to produce large libraries. Using the "phage method" [Scott and Smith, 1990, *Science* 249:386-390 (1990); Cwirla, et al., *Proc. Natl. Acad. Sci.*, 87:6378-6382 (1990); Devlin et al., *Science*, 249:404-406 (1990)], very large libraries can be constructed (10^6 - 10^8 chemical entities). A second approach uses primarily chemical methods, of
30 which the Geysen method [Geysen et al., *Molecular Immunology* 23:709-715 (1986); Geysen et al. *J. Immunologic Method* 102:259-274 (1987)] and the method of Fodor et al. [*Science* 251:767-773 (1991)] are examples. Furka et al. [*14th International Congress of Biochemistry, Volume 5*, Abstract FR:013 (1988); Furka, *Int. J. Peptide Protein Res.* 37:487-493 (1991)], Houghton [U.S. Patent No. 4,631,211, issued December 1986] and Rutter et al. [U.S. Patent No. 5,010,175, issued
35 April 23, 1991] describe methods to produce a mixture of peptides that can be tested as agonists or antagonists.

In another embodiment, synthetic libraries [Needels et al., *Proc. Natl. Acad. Sci. USA* 90:10700-4 (1993); Ohlmeyer et al., *Proc. Natl. Acad. Sci. USA* 90:10922-10926 (1993); Lam et al., International Patent Publication No. WO 92/00252; Kocis et al., International Patent Publication
5 No. WO 9428028, each of which is incorporated herein by reference in its entirety], and the like can be used to screen for ligands according to the present invention.

The screening can be performed with recombinant cells that express a polypeptide of the invention, or alternatively, using purified protein, *e.g.*, produced recombinantly, as described
10 above. For example, labelled, soluble peptides can be used to screen libraries, as described in the foregoing references.

In an embodiment, a polypeptide or polynucleotide or derivative thereof may be directly labelled. In another aspect of the invention a labelled secondary reagent may be used to detect
15 binding of the polynucleotide or polypeptide or derivative thereof to an agent of interest, *e.g.*, a molecule attached to a solid phase support. Binding may be detected by *in situ* formation of a chromophore by an enzyme label. Suitable enzymes include, but are not limited to, alkaline phosphatase and horseradish peroxidase. In a further embodiment, a two colour assay, using two chromogenic substrates with two enzyme labels on different acceptor molecules of interest,
20 may be used. Cross-reactive and singly-reactive ligands may be identified with a two-colour assay.

Other labels for use in the invention include coloured latex beads, magnetic beads, fluorescent labels (*e.g.*, fluoresceine isothiocyanate (FITC), phycoerythrin (PE), Texas red (TR), rhodamine,
25 free or chelated lanthanide series salts, especially Eu^{3+} , to name a few fluorophores), chemiluminescent molecules, radio-isotopes, or magnetic resonance imaging labels. Two colour assays may be performed with two or more coloured latex beads, or fluorophores that emit at different wavelengths. Labelled moieties may be detected visually or by mechanical/optical means. Mechanical/optical means include fluorescence activated sorting, *i.e.*, analogous to
30 FACS, and micromanipulator removal means.

In another embodiment, one may use competitive drug screening assays in which neutralising antibodies capable of binding the polypeptide specifically compete with a test compound for binding sites. In this manner, antibodies can be used to detect the presence of any peptide which
35 shares one or more antigenic determinants with a polypeptide of the present invention.

In a related aspect, the present invention relates to agents identified using the above screening method of the sixth aspect.

In a seventh aspect, the present invention also relates to pharmaceutical compositions. In one
5 embodiment a polypeptide, polynucleotide, fragment thereof, antisense polynucleotide sequence, antibody or agent of the present invention, with or without a pharmaceutically acceptable carrier or vehicle may be administered to a subject for use in the diagnosis, prevention or treatment of disease, such as eosinophil mediated inflammatory disease. Such a disease may include, but is not limited to, asthma, emphysema, COPD, bronchitis, allergic disorders such as
10 atopic dermatitis and NERDS (nodules eosinophilia, rheumatism, dermatitis and swelling); vasculitic granulomatous diseases including polyarteritis, Wegeners granulomatosis; some auto-immune diseases; interstitial and other pulmonary diseases including eosinophilic pneumonia, sarcoiditis and idiopathic pulmonary fibrosis; and neoplastic and myoproliferative diseases including hypereosinophilic syndrome, T cell lymphoma and hodgkins disease.

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In a preferred embodiment, the pharmaceutical composition may comprise an antagonist of the polypeptides of the present invention for administration to a subject to treat or prevent an eosinophil mediated disorder. Such a disorder may include inflammatory disorders of any type, and includes but is not limited to, asthma, emphysema, COPD, bronchitis, allergic disorders
20 such as atopic dermatitis and NERDS (nodules eosinophilia, rheumatism, dermatitis and swelling); vasculitic granulomatous diseases including polyarteritis, Wegeners granulomatosis; some auto-immune diseases; interstitial and other pulmonary diseases including eosinophilic pneumonia, sarcoiditis and idiopathic pulmonary fibrosis; and neoplastic and myoproliferative diseases including hypereosinophilic syndrome, T cell lymphoma and hodgkins disease.

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In another embodiment, the pharmaceutical composition may comprise an antibody which specifically binds a polypeptide of the present invention, for use directly as an antagonist as described above, or indirectly as a targeting or delivery mechanism for bringing a pharmaceutical agent to cells or tissue which express the polypeptide.

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In an additional embodiment, the pharmaceutical composition may comprise the complement of a polynucleotide of the second aspect, for administration to a subject to treat or prevent an inflammatory disease including, but not limited to, those described above. Preferably, a polynucleotide sequence according to the third aspect of the invention will be used. More
35 preferably, the polynucleotide sequence will be in the form of an expression vector, as described above.

In an additional embodiment, the pharmaceutical composition may comprise the polynucleotide or polypeptide sequences, or fragments thereof, of the first and second aspects of the invention for use in treating or preventing an inflammatory disease, preferably an eosinophil mediated

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In further embodiments, any of the polypeptides, antagonists, antibodies, agonists, complementary sequences, or vectors of the invention may be administered in combination with other appropriate therapeutic agents. Selection of the appropriate agents for use in combination therapy may be made by one of ordinary skill in the art, according to conventional
10 pharmaceutical principles. The combination of therapeutic agents may act synergistically to effect the treatment or prevention of the various disorders described above. Using this approach, one may be able to achieve therapeutic efficacy with lower dosages of each agent, thus reducing the potential for adverse side effects.

15 An antagonist of a polypeptide of the present invention may be produced using methods which are generally known in the art. In particular, purified polypeptide may be used to produce antibodies or to screen libraries of pharmaceutical agents to identify those which specifically bind to the polypeptide. Antibodies to a polypeptide of the invention may also be generated using methods that are well known in the art examples of which are described *supra*. Such
20 antibodies may include, but are not limited to, polyclonal, monoclonal, chimeric, and single chain antibodies, Fab fragments, and fragments produced by a Fab expression library. Neutralising antibodies (i.e., those which inhibit dimer formation) are especially preferred for therapeutic use.

25 In an eighth aspect of the invention, there is provided a method of prevention, or treatment of an inflammatory disease, in particular eosinophil mediated disease, comprising administration to a subject a polynucleotide or polypeptide or fragment thereof, or derivatives including complements, antibodies or agents. In one embodiment, a complement of a polynucleotide may be used in diagnosis, prevention or treatment of disease, for example in situations in which it
30 would be desirable to block the transcription of the mRNA. In particular, cells may be transformed with sequences complementary to the polynucleotide of the present invention. Thus, complementary molecules or fragments may be used to modulate polypeptide activity, or to achieve regulation of gene function. Such technology is now well known in the art, and sense or antisense oligonucleotides or larger fragments can be designed from various locations along
35 the coding or control regions of sequences. Preferably, polynucleotide sequences according to the third aspect of the invention will be employed.

In an embodiment of this aspect, it is envisaged that the polynucleotide sequences of the second aspect of the invention may be used in the treatment or prevention of an inflammatory disease, in particular, and eosinophil mediated disease. For example, a polynucleotide sequence according to the second aspect may be administered to a subject by any method described below where it is found that disease or symptoms thereof are the result of a deficiency in a particular polynucleotide or polypeptide sequence. In an embodiment, the method may comprise direct administration of the polypeptide sequences according to the first aspect.

Expression vectors derived from retroviruses, adenoviruses, or herpes or vaccinia viruses, or from various bacterial plasmids, may be used for delivery of nucleotide sequences to the targeted organ, tissue, or cell population. Methods which are well known to those skilled in the art can be used to construct vectors which will express nucleic acid sequences complementary to the polynucleotides of the present invention (See, e.g., Sambrook, *supra*; and Ausubel, *supra*.)

Genes can be turned off by transforming a cell or tissue with expression vectors which express high levels of a polynucleotide, or a fragment thereof. Such constructs may be used to introduce untranslatable sense or antisense sequences into a cell. Even in the absence of integration into the DNA, such vectors may continue to transcribe RNA molecules until they are disabled by endogenous nucleases. Transient expression may last for a month or more with a non-replicating vector, and may last even longer if appropriate replication elements are part of the vector system.

As mentioned above, modifications of gene expression can be obtained by designing complementary sequences or antisense molecules (DNA, RNA, or PNA) to the control, 5', or regulatory regions of the polynucleotides of the present invention. Oligonucleotides derived from the transcription initiation site, e.g., between about positions -10 and +10 from the start site, are preferred. Similarly, inhibition can be achieved using triple helix base-pairing methodology. Triple helix pairing is useful because it causes inhibition of the ability of the double helix to open sufficiently for the binding of polymerases, transcription factors, or regulatory molecules. Recent therapeutic advances using triplex DNA have been described in the literature. (See, e.g., Gee, J.E. et al. (1994) in Huber, B.E. and B.I. Carr, Molecular and Immunologic Approaches, Futura Publishing Co., Mt. Kisco, NY, pp. 163-177.) A complementary sequence or antisense molecule may also be designed to block translation of mRNA by preventing the transcript from binding to ribosomes.

Ribozymes, enzymatic RNA molecules, may also be used to catalyse the specific cleavage of RNA. The mechanism of ribozyme action involves sequence-specific hybridization of the ribozyme molecule to complementary target RNA, followed by endonucleolytic cleavage. For example, engineered hammerhead motif ribozyme molecules may specifically and efficiently catalyse endonucleolytic cleavage of polynucleotide sequences. Specific ribozyme cleavage sites within any potential RNA target are initially identified by scanning the target molecule for ribozyme cleavage sites, including the following sequences: GUA, GUU, and GUC. Once identified, short RNA sequences of between 15 and 20 ribonucleotides, corresponding to the region of the target containing the cleavage site, may be evaluated for secondary structural features which may render the oligonucleotide inoperable. The suitability of candidate targets may also be evaluated by testing accessibility to hybridization with complementary oligonucleotides using ribonuclease protection assays.

Complementary ribonucleic acid molecules and ribozymes of the invention may be prepared by any method known in the art for the synthesis of nucleic acid molecules. These include techniques for chemically synthesising oligonucleotides such as solid phase phosphoramidite chemical synthesis. Alternatively, RNA molecules may be generated by in vitro and in vivo transcription of DNA sequences. Such DNA sequences may be incorporated into a wide variety of vectors with suitable RNA polymerase promoters such as T7 or SP6. Alternatively, these cDNA constructs that synthesise complementary RNA, constitutively or inducibly, can be introduced into cell lines, cells, or tissues.

RNA molecules may be modified to increase intracellular stability and half-life. Possible modifications include, but are not limited to, the addition of flanking sequences at the 5' and/or 3' ends of the molecule, or the use of phosphorothioate or 2'-O-methyl rather than phosphodiesterase linkages within the backbone of the molecule. This concept is inherent in the production of PNAs and can be extended in all of these molecules by the inclusion of nontraditional bases such as inosine, queosine, and wybutosine, as well as acetyl-, methyl-, thio-, and similarly modified forms of adenine, cytidine, guanine, thymine, and uridine which are not as easily recognised by endogenous endonucleases.

Many methods for introducing vectors into cells or tissues are available and are equally suitable for use, in vivo, in vitro, and ex vivo. For ex vivo therapy, vectors may be introduced into stem cells taken from a patient and clonally propagated for autologous transplant back into that same patient. Delivery by transfection, by liposome injections, or by polycationic amino polymers may

be achieved using methods which are well known in the art. (See, e.g., Goldman, C.K. et al. (1997) *Nature Biotechnology* 15:462-466.)

5 A further embodiment of the present aspect relates to the administration of a pharmaceutical or sterile agent, preferably in conjunction with a pharmaceutically acceptable carrier, for use in a method of prevention or treatment of an inflammatory disease, in particular an eosinophil mediated disease. Such pharmaceutical compositions may consist of polynucleotide, polypeptide, fragments thereof, antibodies, and mimetics, agonists, antagonists, or inhibitors. The compositions may be administered alone or in combination with at least one other agent, drug, or
10 hormone, such as a stabilising compound, which may be administered in any sterile, biocompatible pharmaceutical carrier including, but not limited to, saline, buffered saline, dextrose, and water.

The pharmaceutical compositions utilised in this invention may be administered by any number
15 of routes including, but not limited to, oral, intravenous, intramuscular, intra-arterial, intramedullary, intrathecal, intraventricular, transdermal, subcutaneous, intraperitoneal, intranasal, enteral, topical, sublingual, or rectal means.

In addition to the active ingredients, these pharmaceutical compositions may contain suitable
20 pharmaceutically-acceptable carriers comprising excipients and auxiliaries which facilitate processing of the active compounds into preparations which can be used pharmaceutically. Further details on techniques for formulation and administration may be found in the latest edition of Remington's Pharmaceutical Sciences (Maack Publishing Co., Easton, PA).

25 Pharmaceutical compositions for oral administration can be formulated using pharmaceutically acceptable carriers well known in the art in dosages suitable for oral administration. Such carriers enable the pharmaceutical compositions to be formulated as tablets, pills, dragees, capsules, liquids, gels, syrups, slurries, suspensions, and the like, for ingestion by the patient.

30 Pharmaceutical preparations for oral use can be obtained through combining active compounds with solid excipient and processing the resultant mixture of granules (optionally, after grinding) to obtain tablets or dragee cores. Suitable auxiliaries can be added, if desired. Suitable excipients include carbohydrate or protein fillers, such as sugars, including lactose, sucrose, mannitol, and sorbitol; starch from corn, wheat, rice, potato, or other plants; cellulose, such as
35 methyl cellulose, hydroxypropylmethyl-cellulose, or sodium carboxymethylcellulose; gums, including arabic and tragacanth; and proteins, such as gelatin and collagen. If desired,

disintegrating or solubilising agents may be added, such as the cross-linked polyvinyl pyrrolidone, agar, and alginic acid or a salt thereof, such as sodium alginate.

5 Dragee cores may be used in conjunction with suitable coatings, such as concentrated sugar solutions, which may also contain gum arabic, talc, polyvinylpyrrolidone, carbopol gel, polyethylene glycol, and/or titanium dioxide, lacquer solutions, and suitable organic solvents or solvent mixtures. Dyestuffs or pigments may be added to the tablets or dragee coatings for product identification or to characterise the quantity of active compound, i.e., dosage.

10 Pharmaceutical preparations which can be used orally include push-fit capsules made of gelatin, as well as soft, sealed capsules made of gelatin and a coating, such as glycerol or sorbitol. Push-fit capsules can contain active ingredients mixed with fillers or binders, such as lactose or starches, lubricants, such as talc or magnesium stearate, and, optionally, stabilizers. In soft capsules, the active compounds may be dissolved or suspended in suitable liquids, such as fatty oils, liquid, or
15 liquid polyethylene glycol with or without stabilisers.

Pharmaceutical formulations suitable for parenteral administration may be formulated in aqueous solutions, preferably in physiologically compatible buffers such as Hanks's solution, Ringer's solution, or physiologically buffered saline. Aqueous injection suspensions may contain
20 substances which increase the viscosity of the suspension, such as sodium carboxymethyl cellulose, sorbitol, or dextran. Additionally, suspensions of the active compounds may be prepared as appropriate oily injection suspensions. Suitable lipophilic solvents or vehicles include fatty oils, such as sesame oil, or synthetic fatty acid esters, such as ethyl oleate, triglycerides, or liposomes. Non-lipid polycationic amino polymers may also be used for
25 delivery. Optionally, the suspension may also contain suitable stabilisers or agents to increase the solubility of the compounds and allow for the preparation of highly concentrated solutions.

For topical or nasal administration, penetrants appropriate to the particular barrier to be permeated are used in the formulation. Such penetrants are generally known in the art.

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The pharmaceutical compositions of the present invention may be manufactured in a manner that is known in the art, e.g., by means of conventional mixing, dissolving, granulating, dragee-making, levigating, emulsifying, encapsulating, entrapping, or lyophilizing processes. The pharmaceutical composition may be provided as a salt and can be formed with many acids,
35 including but not limited to, hydrochloric, sulphuric, acetic, lactic, tartaric, malic, and succinic acid. Salts tend to be more soluble in aqueous or other protonic solvents than are the

corresponding free base forms. In other cases, the preferred preparation may be a lyophilized powder which may contain any or all of the following: 1 mM to 50 mM histidine, 0.1 % to 2% sucrose, and 2% to 7% mannitol, at a pH range of 4.5 to 5.5, that is combined with buffer prior to use. After pharmaceutical compositions have been prepared, they can be placed in an appropriate container and labelled for treatment of an indicated condition. For administration of polypeptides of the present invention, such labelling would include amount, frequency, and method of administration.

Pharmaceutical compositions suitable for use in the invention include compositions wherein the active ingredients are contained in an effective amount to achieve the intended purpose. The determination of an effective dose is well within the capability of those skilled in the art. For any compound, the therapeutically effective dose can be estimated initially either in cell culture assays, e.g., of neoplastic cells or in animal models such as mice, rats, rabbits, dogs, or pigs. An animal model may also be used to determine the appropriate concentration range and route of administration. Such information can then be used to determine useful doses and routes for administration in humans. A therapeutically effective dose refers to that amount of active ingredient, for example polypeptide, antibody, agonist, antagonist or inhibitors, which ameliorates the symptoms or condition. Therapeutic efficacy and toxicity may be determined by standard pharmaceutical procedures in cell cultures or with experimental animals, such as by calculating the ED50 (the dose therapeutically effective in 50% of the population) or LD50. (the dose lethal to 50% of the population) statistics. The dose ratio of therapeutic to toxic effects is the therapeutic index, and it can be expressed as the ED50/LD50 ratio. Pharmaceutical compositions which exhibit large therapeutic indices are preferred. The data obtained from cell culture assays and animal studies are used to formulate a range of dosage for human use. The dosage contained in such compositions is preferably within a range of circulating concentrations that includes the ED50 with little or no toxicity. The dosage varies within this range depending upon the dosage form employed, the sensitivity of the patient, and the route of administration. The exact dosage will be determined by the practitioner, in light of factors related to the subject requiring treatment. Dosage and administration are adjusted to provide sufficient levels of the active moiety or to maintain the desired effect. Factors which may be taken into account include the severity of the disease state, the general health of the subject, the age, weight, and gender of the subject, time and frequency of administration, drug combination(s), reaction sensitivities, and response to therapy. Long-acting pharmaceutical compositions may be administered every 3 to 4 days, every week, or biweekly depending on the half-life and clearance rate of the particular formulation.

Normal dosage amounts may vary from about 0.1 ug to 100,000 ug, up to a total dose of about 1 gram, depending upon the route of administration. Guidance as to particular dosages and methods of delivery is provided in the literature and generally available to practitioners in the art.

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Those skilled in the art will employ different formulations for nucleotides than for proteins or their inhibitors. Similarly, delivery of polynucleotides or polypeptides will be specific to particular cells, conditions, locations, etc.

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Any of the therapeutic methods described above may be applied to any subject in need of such therapy, including, for example, mammals such as dogs, cats, cows, horses, rabbits, monkeys, and most preferably, humans.

15

In another aspect, there is provided a method of diagnosis of disease in a subject, comprising administration to the subject antibodies which specifically bind the polypeptides of the invention. Antibodies may be used for the diagnosis of disorders characterised by expression of polypeptides of the invention, or in assays to monitor patients being treated with polypeptides or agonists, antagonists, or inhibitors. Antibodies useful for diagnostic purposes may be prepared in the same manner as described above for therapeutics. Diagnostic assays include methods which utilise the antibody and a label to detect polypeptide in human body fluids or in extracts of cells or tissues. The antibodies may be used with or without modification, and may be labelled by covalent or non-covalent attachment of a reporter molecule. A wide variety of reporter molecules, several of which are described above, are known in the art and may be used.

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A variety of protocols for measuring proteins including ELISAS, RIAS, and FACS, are known in the art and provide a basis for diagnosing altered or abnormal levels of protein expression. Normal or standard values for expression are established by combining body fluids or cell extracts taken from normal mammalian subjects, preferably human, with antibody under conditions suitable for complex formation. The amount of standard complex formation may be quantitated by various methods, preferably by photometric means. Expression levels in subject, control, and disease samples from biopsied tissues are compared with the standard values. Deviation between standard and subject values establishes the parameters for diagnosing disease.

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In another embodiment, there is provided a method of diagnosis of disease in a subject, the method comprising administration of polynucleotides of the present invention. The

polynucleotides which may be used include oligonucleotide sequences, complementary RNA and DNA molecules, and PNAS. The polynucleotides may be used to detect and quantitate gene expression in biopsied tissues in which expression may be correlated with disease. The diagnostic assay may be used to determine absence, presence, and excess expression of polypeptides of the present invention, and to monitor regulation of expression levels during therapeutic intervention.

In a further embodiment, a method of diagnosis is provided which comprises administration to a subject of probes which are capable of detecting polynucleotide sequences, including genomic sequences, encoding polypeptides of the invention or closely related molecules. Such probes may be used to identify nucleic acid sequences which encode polypeptides of the invention. The specificity of the probe, whether it is made from a highly specific region, e.g., the 5' regulatory region, or from a less specific region, e.g., a conserved motif, and the stringency of the hybridization or amplification (maximal, high, intermediate, or low), will determine whether the probe identifies only naturally occurring sequences encoding polypeptides of the invention, alleles, or related sequences.

Probes may also be used for the detection of related sequences, and should preferably have at least 50% sequence identity to any of the polynucleotide sequences of the present invention. The hybridization probes of the subject invention may be DNA or RNA and may be derived from the sequence of Figure 2, or 4.

Means for producing specific hybridization probes for DNAs include the cloning of polynucleotide sequences of the present invention or derivatives thereof into vectors for the production of mRNA probes. Such vectors are known in the art, are commercially available, and may be used to synthesise RNA probes in vitro by means of the addition of the appropriate RNA polymerases and the appropriate labelled nucleotides. Hybridization probes may be labelled by a variety of reporter groups, for example, by radionucleotides such as P^{32} , S^{31} or by enzymatic labels, such as alkaline phosphatase coupled to the probe via avidin/biotin coupling systems, and the like.

In further embodiments, oligonucleotides or longer fragments derived from any of the polynucleotide sequences described herein may be used as targets in a microarray. The microarray can be used to monitor the expression level of large numbers of genes simultaneously and to identify genetic variants, mutations, and polymorphisms. This information may be used to determine gene function, to understand the genetic basis of a disorder, to diagnose a disorder, and to develop and monitor the activities of therapeutic agents. Microarrays may be prepared,

used, and analysed using methods known in the art. (See, 20 e.g., Brennan, T.M. et al. (1995) U.S. Patent No. 5,474,796; Schena, M. et al. (1996) Proc. Natl. Acad. Sci. 93:10614-10619; Baldeschweiler et al. (1995) PCT application W095/251116; Shalon, D. et al. (1995) PCT application W095135505; Heller, R.A. et al. (1997) Proc. Natl. Acad. Sci. 94:2150-2155; and
5 Heller, M.J. et al. (1997) U.S. Patent No. 5,605,662).

The polynucleotide sequences of the present invention may be used in Southern or northern analysis, dot blot, or other membrane-based technologies; in PCR technologies; in dipstick, pin, and ELISA assays; and in microarrays utilising fluids or tissues from patients to detect altered
10 gene expression. Such qualitative or quantitative methods are well known in the art.

In a particular embodiment, the nucleotide sequences of the present invention may be useful in assays that detect the presence of associated disorders, particularly those mentioned above. The nucleotide sequences may be labelled by standard methods and added to a fluid or tissue sample
15 from a patient under conditions suitable for the formation of hybridization complexes. After a suitable incubation period, the sample is washed and the signal is quantitated and compared with a standard value. If the amount of signal in the patient sample is significantly altered in comparison to a control sample then the presence of altered levels of nucleotide sequences in the sample indicates the presence of the associated disorder. Such assays may also be used to
20 evaluate the efficacy of a particular therapeutic treatment regimen in animal studies, in clinical trials, or to monitor the treatment of an individual patient.

Also envisaged are methods of diagnosis comprising administration to a subject of agents including agonists and antagonists of the polypeptides of the invention, the polypeptides of the
25 invention or fragments thereof, and complements of the polynucleotides of the invention.

The above molecules of the present invention may be used for the diagnosis of eosinophil mediated inflammatory disease. Examples of such disorders include, but are not limited to asthma, emphysema, COPD, bronchitis, allergic disorders such as atopic dermatitis and
30 NERDS (nodules, eosinophilia, rheumatism, dermatitis and swelling); vasculitic granulomatous diseases including polyarteritis, Wegeners granulomatosis; some auto-immune diseases; interstitial and other pulmonary diseases including eosinophilic pneumonia, sarcoiditis and idiopathic pulmonary fibrosis; and neoplastic and myoproliferative diseases including hypereosinophilic syndrome, T cell lymphoma and hodgkins disease.

In order to provide a basis for the diagnosis of an eosinophil mediated inflammatory disorder, a normal or standard profile for expression is established. This may be accomplished by combining body fluids or cell extracts taken from normal subjects, either animal or human, with at least one sequence, or a fragment thereof, under conditions suitable for hybridization or amplification. Standard hybridization may be quantified by comparing the values obtained from normal subjects with values from an experiment in which a known amount of a substantially purified polynucleotide is used. Standard values obtained in this manner may be compared with values obtained from samples from patients who are symptomatic for a disorder. Deviation from standard values is used to establish the presence of a disorder. Once the presence of a disorder is established and a treatment protocol is initiated, hybridization assays may be repeated on a regular basis to determine if the level of expression in the patient begins to approximate that which is observed in the normal subject. The results obtained from successive assays may be used to show the efficacy of treatment over a period ranging from several days to months.

15

A more definitive diagnosis of this type may allow health professionals to employ preventative measures or aggressive treatment earlier thereby preventing the development or further progression of the disease.

Additional diagnostic uses for polynucleotides of the present invention may involve the use of PCR. Oligomers may be chemically synthesised, generated, enzymatically, or produced in vitro. Oligomers will preferably contain a fragment of a polynucleotide of the present invention, or a fragment of a polynucleotide complementary thereto, and will be employed under optimised conditions for identification of a specific gene or condition. Oligomers may also be employed under less stringent conditions for detection or quantitation of closely related DNA or RNA sequences. Methods which may also be used to quantitate expression include radiolabelling or biotinylating nucleotides, coamplification of a control nucleic acid, and interpolating results from standard curves. (See, e.g., Melby, P.C. et al. (1993) J. Immunol. Methods 159:235-244; and Duplaa, C. et al. (1993) Anal. Biochem. 229-236). The speed of quantitation of multiple samples may be accelerated by running the assay in an ELISA format where the oligomer of interest is presented in various dilutions and a spectrophotometric or calorimetric response gives rapid quantitation.

In another aspect of the present invention, polynucleotide sequences of the invention may be used to generate hybridisation probes useful in mapping the naturally occurring genomic sequence. The sequences may be mapped to a particular chromosome, to a specific region of a

chromosome, or to artificial chromosome constructions, e.g., human artificial chromosomes (HACs), yeast artificial chromosomes (YACs), bacterial artificial chromosomes (BACs), bacterial PI constructions, or single chromosome cDNA libraries. (See, e.g., Price, C.M. (1993) 30 Blood Rev. 7:127-134; and Trask, B.J. (1991) Trends Genet. 7:149-154).

5

Fluorescent in situ hybridization (FISH) may be correlated with other physical chromosome mapping techniques and genetic map data. (See, e.g., Heinz-Ulrich, *et al.*(1995)in Meyers, R.A. (ed.) Molecular Biology and Biotechnology, VCH Publishers New York, NY, pp.965-968). Examples of genetic map data can be found in Various scientific journals or at the Online
10 Mendelian Inheritance in Man (OMB4) site. Correlation between the location of the gene on a physical chromosomal map and a specific disorder, or a predisposition to a specific disorder, may help define the region of DNA associated with that disorder. The nucleotide sequences of the invention may be used to detect differences in gene sequences among normal, carrier, and affected individuals.

15

In situ hybridization of chromosomal preparations and physical mapping techniques, such as linkage analysis using established chromosomal markers, may be used for extending genetic maps. Often the placement of a gene on the chromosome of another mammalian species, such as mouse, may reveal associated markers even if the number or arm of a particular human
20 chromosome is not known. New sequences can be assigned to chromosomal arms by physical mapping. This provides valuable information to investigators searching for disease genes using positional cloning or other gene discovery techniques. Once the disease or syndrome has been crudely localised by genetic linkage to a particular genomic region, any sequences mapping to that area may represent associated or regulatory genes for further investigation. (See, e.g., Gatti,
25 R.A. *et al.* (1988) Nature 336:577-580). The nucleotide sequence of the subject invention may also be used to detect differences in the chromosomal location due to translocation, inversion, etc., among normal, carrier, or affected individuals.

In yet another aspect of the invention, there is provided a transgenic non-human animal
30 comprising a polynucleotide sequence according to the second or third aspects of the invention. The transgenic non-human animal may comprise a polypeptide according to the first aspect of the invention.

In further aspects, the polynucleotide or polypeptide sequences of the present invention may be
35 used in any molecular biology techniques that have yet to be developed, provided the new

techniques rely on properties of nucleotide sequences that are currently known, including, but not limited to, such properties as the triplet genetic code and specific base pair interactions.

The present invention may be better understood by reference to the following non-limiting

- 5 Examples, which are provided as exemplary of the invention. The present invention is not to be limited in scope by the specific embodiments described herein. Indeed, various modifications of the invention in addition to those described herein will become apparent to those skilled in the art from the foregoing description and the accompanying figures. Such modifications are intended to fall within the scope of the invention.

10

It is further to be understood that all base sizes or amino acid sizes, and all molecular weight or molecular mass values, given for nucleic acids or polypeptides are approximate, and are provided for description.

EXAMPLES**Example 1: Cloning of Human Eosinophil cDNA**

5 This example describes the cloning of polynucleic acids expressed by human peripheral blood eosinophils.

Example 1.1: Purification of Human Peripheral Blood Eosinophils

Eosinophils were purified from 200ml whole blood essentially as described by Dubois et al.,
10 *Am. J. Respir. Cell Mol. Biol.*, 1998. Essentially, the blood was layered on to Accuspin tubes with filter histopaques (Sigma) and centrifuged (2100rpm) for 20 minutes. The Peripheral Blood Mononuclear Cell (PBMC) layer was carefully removed and the filters washed twice with PBS. The filters were punctured and the blood (approx.15ml) under each filter was transferred to sterile 50ml tubes. The lysis of the red blood cells was performed as follows:
15 6% dextran (6ml) and PBS (44ml) were added to each tube, the lysis solution was mixed by inverting and left to incubate for 45 min. at room temperature (RT). The supernatants were subsequently collected, pooled and centrifuged (1,600rpm) for 5 min. The resultant pellet was resuspended in PBS (5ml) and hypotonic shock was performed to completely remove the red blood cell contamination from the granulocyte layer. The granulocytes were incubated with
20 anti-CD16 beads (Dyna, Norway) for 40 min. at 4°C and the eosinophils subsequently purified from the neutrophils by negative selection.

Example 1.2: Extraction of Total Cellular RNA

Total cellular RNA was extracted from the eosinophils using essentially the modified
25 RNazolB method described by Kodavanti et al. *Exp. Lung Res.*, 1996. Total cellular RNA quality was assessed by electrophoresis through formamide/formaldehyde TAE gels, as described in (Maniatis T. et al., "Molecular Cloning, a Laboratory Manual," Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., 1982; Ausubel F.M. et al. (eds.), "Current Protocols in Molecular Biology," John Wiley & Sons, New York, 1987). Both 28 S and 18S
30 ribosomal RNAs were detected as shown in figure 1.

Example 1.3: Extraction of polyA+ mRNA

Poly(A) mRNA was purified from total RNA using a Micro poly A+ kit (Ambion), according to the manufacturers protocol.

Example 1.4: Production of PCR amplified cDNA

cDNA was synthesised from 400ng human eosinophil mRNA SMART PCR cDNA Synthesis Kit (Clontech). The methodology used was essentially as described by the manufacturer, with the following modifications: the two 5' and 3' SMART oligonucleotide primers, respectively, were replaced by modified HPLC purified primers having the sequence shown in figure 4. These primers contain essentially the same amplification and Poly dT sequences described by the manufacturers Clontech. The RsaI restriction sites are replaced by AscI and NotI restriction sites. These new restriction sites, allow directional cloning, but also have 8-base pair enzyme recognition sequences. 8-base pair recognition sequences are rare in mammalian genes, consequently cDNA sequences are unlikely to be digested internally with the use of these enzymes. The size range of the amplified cDNA was between 200bp and 7kb as shown in figure 2.

Example 1.5: Modification of cDNA library cloning vector

The vectors pSKII (Stratagene) was modified by the inclusion of additional 8bp sites (AscI and PacI). The vector was digested PstI/EcoRI and ligated with dephosphorylated double stranded oligonucleotides to generate the additional 8bp sites shown in figure 5. The genetic engineering techniques used to clone and insert cDNAs into these plasmids employed routine protocols described in Maniatis, 1989.

Example 1.6: cDNA Library Construction

PCR amplified cDNA (approx. 15µg) was digested with NotI and AscI, and size fractionated on a Sephacryl S-500 gel filtration column (Gibco BRL Life Technologies), as described by the manufacturer. Fractions containing cDNA >500bp were combined and ligated. All ligations were performed in 20µl reaction volume using 50ng modified pBluescript SK II (+) vector, 80ng cDNA and 1 unit of T4 DNA Ligase (Gibco BRL Life Technologies), and incubated at 16°C O/N. Ligation reactions were purified (phenol/chloroform extraction and ethanol precipitated, as described in Maniatis, 1989) and used to transform *E. Coli* TG1 cells (supE, hsdD5, thi, D(lac-proAB), F'(tra D36 pro A⁺ B⁺ lacI^q lacZDM15), Stratagene) by electrophoration as follows: TG1 cells were thawed on ice and mixed with 1µl ligated DNA. The cell/DNA mixture was transferred to a chilled electroporation cuvette (0.1 cm; BIORAD) and pulsed for 4 seconds at (1700V, 200A, 25µF; Gene Pulser II; BIO RAD). SOC (960µl) was added to resuspend the cells, and the suspension incubated at 37°C for 1h. Transformed cells are plated onto LB Agar (L-broth: NaCl (5 g/l), Bacto-tryptone (10 g/l), Yeast extract (5 g/l);

Difco), containing ampicillin, under blue/white selection. The library contained $> 1 \times 10^6$ independent clones, with an average insert size range of 400bp to 2.5kb as determined by restriction digest.

5 ***Example 1.7: Normalisation of cDNA Library***

Plasmid DNA from the eosinophil cDNA library (50 μ g) was digested with AscI/NotI restriction enzymes and the insert fragments isolated by gel purification (called 'Tracer'). Purified PCR products which had been amplified (using T7/T3 primer sequences) from 5000 eosinophil miniprep cDNA clones were pooled and photobiotinylated ('Driver'). The methodology for photobiotinylation and subtraction, was essentially as described by Wang, Z and Brown, DD; *Proc Natl Acad Sci U S A* 1991 Dec 15;88(24):11505-9. Two rounds of hybridisation/subtraction (68°C, 20h) with 100:1 biotinylated Driver:Tracer ratio are carried out. Hybrids were removed with Streptavidin and extracted 5 times with phenol/chloroform. The enriched Tracer DNA was ethanol precipitated, ligated into modified pSK II and transformed in *E Coli* TG1 cells by electroporation (as described in Example 1.6).

15 ***Example 1.8: Purification of Plasmid DNA***

Plasmid DNA clones was purified on a Qiagen 9600 Robot, using Qiaprep 96 Turbo kits (Qiagen), as described by the manufacturer.

20

Example 2: High Throughput Sequencing

This example describes determination of the complete/partial DNA sequence of each isolated cDNA clone. The cDNA was sequenced, using an Applied Biosystems 377 or 373 DNA Sequencing System, using the Prism Big Dye Terminator Cycle Sequencing chemistry (PE-BioSystems). The modified pBluescriptIIISK/cDNA insert clones are sequenced on the 5' and the 3' vector strand using the T3 promoter primer (5'AATTAACCCTCACTAAAGGG3') and the T7 promoter primer, respectively (5'TAATACGACTCACTATAGGG3'). Where necessary the cDNA was sequenced internally using primers based on previous sequencing results, essentially following the same protocols.

30

Example 3: Database Search and Sequence Annotation

This example describes searching the publicly available databases GenBank, SwissProt, TrEMBL (Bairoch A., Apweiler R., "The SWISS-PROT protein sequence data bank and its supplement TrEMBL", *Nucleic Acids Res* 1999 Jan 1;27(1):49-54) and PFAM (Bateman A, etal. "Pfam 3.1: 1313 multiple alignments and profile HMMs match the majority of proteins", *Nucleic Acids Res.* 1999 Jan 1;27(1):260-2.). GenBank is the NIH genetic sequence database,

35

an annotated collection of all publicly available DNA sequences (Nucleic Acids Research 1999 Jan 1;27(1):12-7) and has been searched for certain of the nucleotide sequences of the invention, which correspond to the determined DNA sequences for each isolated cDNA clone, to ensure the novelty of these sequences. Additional sequencing has been performed for
5 sequence elongation, sequence assembly and sequence verification. Functional annotation *in silico* may be performed to search the deduced protein sequences for protein domains and similarities to known protein sequences.

The base-calling program Phred (Ewing B. et al., "Base-calling of automated sequencer traces using phred. II. Error probabilities", *Genome Res* 1998 Mar;8(3):186-94) was used to analyse
10 the DNA sequence traces, to deduce nucleotide sequences and to assign quality scores for each individual nucleotide of these sequences. The derived sequences covering the 5' end of each clone insert were compared versus the GenBank databases version 111 for primate sequences and version 110 for pubESTs, respectively using the BLAST database search program version
15 2.0.8 (Altschul, S. et al., "Gapped BLAST and PSI-BLAST: a new generation of protein database search programs", *Nucleic Acids Res* 1997 Sep 1;25(17):3389-402). In order to identify and mask repetitive regions all query sequences were firstly compared against a database containing a collection of human repetitive sequences called REPBASE (Prepared for National Center for Biotechnology Information Contract No. N01-LM-2-3526 P.I. Jerzy
20 Jurka, Linus Pauling Institute of Science and Medicine 440 Page Mill Rd Palo Alto, CA 94306). The XBLAST software (Claverie J. M. and States D. J. "Information Enhancement Methods for Large Scale Sequence Analysis", *Computers and Chemistry* 1993, 17: 191-201.) was used to mask all regions with homology to any of those repeat sequences. Functionally, XBLAST reads a BLAST output file and generates query sequences where all segments with
25 hits are masked. BLAST version 2.0.8 was used for subsequent database searches of these masked query sequences against all database entries of the GenBank databases version 111 for primate sequences and version 110 for pubESTs and to evaluates the statistical significance of detected sequence similarities.

30 None of the polynucleotide sequences filed here showed significant homology in GenBank databases version 111 for non-genomic primate (pri) sequences and version 110 for public EST sequences (pubEST). All these sequences were found to be above the user-selected threshold of significance (BLAST e-value) of 10^{-7} and are therefor assumed to represent novel human cDNA sequences.

35

144 cDNA clones were elongated by generating the 3' sequence for each clone. The corresponding 5' and 3' read of each clone insert was assembled utilising the Phrap software ("phragment assembly program", or "phil's revised assembly program"; ©1994-1999 by Phil Green, University of Washington) and the resulting sequence assemblies ("contigs") were manually edited in the Consed sequence editor (Gordon D. et al., "Consed: a graphical tool for sequence finishing", *Genome Res* 1998 Mar;8(3):195-202) to increase the accuracy of the deduced consensus sequences. These derived consensus sequences correspond to the full-length insert of each cDNA clone. The resulting sequences correspond to Seq Id Nos: 1-466 (polynucleotide) all of which are at least 200 nucleotides in length, and include no more than 8% of uncalled bases (where N is recorded rather than A, C, G, or T).

For functional annotation *in silico* the deduced protein sequence may be examined using different approaches to detect remote homologies to characterised protein sequences and similarities to known protein domains. These methods include sequence comparisons against different databases including GenBank and PFAM (Bateman A, et al. "Pfam 3.1: 1313 multiple alignments and profile HMMs match the majority of proteins", *Nucleic Acids Res.* 1999 Jan 1;27(1):260-2.) and sensitive search algorithms using iterated sequence database search methods (Taylor WR, et al. "Iterated sequence databank search methods." *Comput Chem.* 1999 Jun 15;23(3-4):365-85.) and profile hidden Markov models for the detection of distant sequence homologs and low conserved protein domains (Eddy SR, et al., "Maximum discrimination hidden Markov models of sequence consensus", *J Comput Biol.* 1995 Spring;2(1):9-23.).

For the sequence listing the most 5-prime region of each sequence has been translated in all three possible reading frames and specified whenever the deduced product resulted in a hypothetical peptide of more than 9 amino acids. Additional 5-prime sequence information can be unravelled in order to define the correct and full length coding sequence.

30 Example 4: Construction and Use of Microarray, for Amersham Microarray System

This example describes the use of a microarray system developed and commercialised (Amersham Pharmacia Biotechnology). This methodology, essentially using protocols pioneered by Pat Brown and colleagues (Schena, M et al. Quantitative monitoring of gene expression patterns with a complementary DNA microarray. *Science* 270, 467-470 (1995).

35

Example 4.1: PCR Amplification of cDNA

cDNA fragments of up to 2.5kb in length were amplified by PCR from the eosinophil cDNA clones. PCR reactions (100 µl) were performed in 1x Taq DNA Polymerase buffer using 2.5 U Taq DNA polymerase (Qiagen), 100 mM dNTPs and 400 nM each of T7 and T3 primers [T7 primer: 5'GTAATACGACTCACTATAGGGC3', T3 primer: 5'AATTAACCCTCACTAAAGGG3']. PCR was performed in 96 well microtitre plates with a 1 min denaturation step at 94°C, 36 rounds of amplification (denaturation 94°C, 40 sec, annealing 55°C, 30 sec, extension 72°C, 2 min), followed by a 2min extension step at 72°C.

Example 4.2: Purification, QC and Quantitation of PCR Products

Quadruplicate 100µl PCR reactions were pooled and purified on a Biorobot-9600 (Qiagen) using the Qiaquick 96 PCR Biorobot kit (Qiagen). 100µl of PCR reactions were mixed with 500µl of buffer PB and applied sequentially to Qiaquick modules until the 4 replicate reactions had been applied to a single well. Qiaquick modules were washed with 2 x 750µl of PE per well, dried using the vacuum manifold and DNA was eluted with 80µl of water into 96 well microtitre plates.

DNA was quantitated using the fluorescent reagent Sybrgreen (Molecular Probes). 300µl of a 1:3000 of the Sybrgreen dye was mixed with 1µl of purified DNA in a 96 well white Opti plate (Packard). Fluorescence was measured, using a Victor plate reader (Wallac), at an excitation wavelength of 495nm and an emission wavelength of 520nm. A standard curve was constructed using a plasmid DNA dilution series; the concentrations of which were determined by Absorbance at 260nm.

All purified DNA samples were analysed by agarose gel electrophoresis to verify that PCR fragments of a size consistent with the sequencing analysis for that clone (see example 2) had been generated. Samples were dried in a centrifugal evaporator (Savant) and reconstituted to 500 ng/µl in 50% (v/v) DMSO. 20µl of sample /well was transferred from 4 (96 well) microtitre plates to a 384 well microtitre plate for spotting onto microarray slides.

Example 4.3: Spotting of Microarray

DNA was spotted onto Type 7 mirrored slides (Amersham) using the GenIII microarray spotter (Amersham), using conditions essentially as described by the manufacturer. Humidity was controlled within the spotter at 55%. Normal mode spotting was employed which produced replicate arrays on the right and left side of each slide. UV crosslinking of the DNA onto the slides was achieved using a CL-100 Ultraviolet Crosslinker (UVP) set at 100mJ/cm². Slides were stored dessicated in the dark until use.

Example 4.4: Preparation of Fluorescently labelled Samples

Example 4.4.1: RNA preparation

RNA was prepared from either primary cells (e.g. eosinophils) or from cell lines (e.g. A549 human lung epithelial cells). Total RNA was isolated from cell lines using the RNeasy kit (Qiagen), using procedures as described by the manufacturer. RNA was isolated from primary cells using the modified RNazolB method described by Kodavanti et al. Exp. Lung Res., 1996. Total RNA integrity was assessed by denaturing agarose gel electrophoresis, as described in Example 1.2. RNA was quantified by Abs 260nm determination.

Poly(A+) mRNA was purified from total cellular RNA using a Micro poly A+ kit (Ambion), according to the manufacturer's protocol.

Example 4.4.2: Labelled cRNA Samples

1 µg of mRNA and 100 pmoles of T7-(dT)₂₄ were denatured at 70°C for 10min in a volume of 13µl. DTT, dNTPs and 5X 1st strand buffer were added to 10mM, 0.5mM and 1X respectively, and incubated in a total volume of 20µl for 2 min at 37°C. Reverse transcription was initiated by addition of 1µl of 200 U/µl superscript II enzyme (Gibco BRL Life Technologies) and incubating at 37°C for 1 h. Second strand cDNA synthesis was initiated by addition of 1µl of 10U/µl DNA Ligase (Gibco BRL Life Technologies), 4µl of 10U/µl DNA Polymerase I (Gibco BRL Life Technologies), 1µl of 2U/µl RNase H (Gibco BRL Life Technologies) and incubated in a total volume of 150µl for 2 hours at 16°C. After this incubation 2µl of 5U/µl T4 DNA Polymerase was added and incubated for 5 minutes at 16°C. 10µl of 0.5M EDTA was added to the double stranded cDNA. The cDNA was, phenol/chloroform extracted, ethanol precipitated, washed with 70% ethanol and air dried. 0.5-1µg of linearised T7 cDNA template was reconstituted in a volume of 2µl of DEPC water (Ambion). T7 10X reaction buffer (Ambion), rA/C/GTP, rUTP and rcyUTP (either Cy3 labelled CTP or Cy5 labelled CTP, Amersham) were added to 1X, 150nmoles, 100nmoles and 30nmoles respectively. *In-vitro* transcription was initiated by adding 2µl of T7 RNA Polymerase (Ambion) and incubated in a total volume of 20µl for 6 hours at 37°C. After this incubation the DNA template was removed by addition of 1µl of RNase-free DNase (Ambion) and incubated for 15 min at 37°C. The labelled cRNA sample was then purified using a RNeasy purification kit (Qiagen), essentially as described by the manufacturers but with two washes with PE buffer and elution with 2x 40µl of DEPC water. The resultant purified sample was, quantitated by Abs260nm, aliquoted into amounts corresponding to 2µg of cRNA

per tube and dried in a centrifugal evaporator (Savant model SC110). Sample was stored at -20°C in the dark until ready to use in the hybridisation.

Example 4.4.3: Labelled cDNA Samples from Total RNA

5 25 µg of total RNA and 1µg of Oligo dT (Amersham) were denatured at 70°C for 10 minutes in a volume of 11µl. DTT, dNTPs, dcyCTP (either Cy3 labelled CTP or Cy5 labelled CTP, Amersham) and 5X 1st strand buffer were added to 10mM, 0.1mM, 62nM and 1X respectively, and incubated in a total volume of 19µl for 10 min at 22°C. Reverse transcription was initiated by addition of 2µl of 200U/µl superscript II enzyme (Gibco BRL Life
10 Technologies) and incubating at 42°C for 2.5 h. After this incubation the cDNA sample was ethanol precipitated, washed with 70% ethanol, air dried and resuspended in 40µl of water. The cDNA:mRNA hybrid was denatured by addition of NaOH to 250mM and incubating at 37°C for 10 min. The hydrolysis was terminated by neutralisation with 6µl of 1M HEPES pH 8. The labelled cDNA sample was then purified using a PCR purification kit (Qiagen),
15 essentially as described by the manufacturers but with two washes with PE buffer and elution with 2x 30µl of 10mM Tris pH 8.5. The resultant purified sample was aliquoted into amounts corresponding to preparations from 10µg of total RNA per tube and dried in a centrifugal evaporator (Savant). Sample was stored at -20°C in the dark until ready to use in the hybridisation
20

Example 4.4.4: Labelled cDNA Samples from mRNA

cDNA samples prepared from mRNA were made using essentially the same procedure detailed in section 4.4.3 but using 2.5 µg of mRNA instead of 25 µg of total RNA. Sample was aliquoted at the final stage into amounts corresponding to preparations from 1 µg of starting
25 mRNA per tube.

Example 4.5: Hybridisation of Microarray

Example 4.5.1: Pre-treatment of microarray slides

30 Microarrayed slides (Example 4.3) are pre-treated by incubating in 5xSSC/0.2% SDS for 2 h at 60°C. Slides are washed 5x in distilled water, 2x in isopropanol and dried rapidly using a compressed air can.

Example 4.5.2: Hybridisation

Hybridisation mixtures for a single slide were prepared as follows. An aliquot of labelled sample (prepared as described in Examples 4.4.2, 4.4.3 or 4.4.4) was reconstituted in 6.7 µl of water, denaturing at 95°C for 2 min and then incubated on ice for 2 min. The sample was then added to a hybridisation mix that had been pre-equilibrated at 42°C to give final concentration of 3µg/ml Oligo A80, 50% formamide in 1x Type II hybridisation buffer (Amersham). The total volume of the hybridisation mixture was 40µl per slide and this was applied to the pre-treated microarray slides and incubated under a coverslip (22mm x 65mm), in a humid chamber at 42°C overnight.

Example 4.5.3: Post Hybridisation washes

Post hybridisation washes were performed at 55°C as follows.

Wash 1 - 5 min wash in 1xSSC/0.2% SDS for 5 min

Wash 2- 10 min wash in 0.1xSSC/0.2% SDS

Wash 3- 10 min wash in 0.1xSSC/0.2% SDS

Wash 4- 10 min wash in 0.01xSSC/0.1%SDS

Slides are rinsed with distilled water, dried rapidly with compressed air.

Example 4.6: Scanning of Microarray

The fluorescence of each spot was determined by scanning the slides in a GenIII microarray scanner (Amersham). Cy3 fluorescence was determined using an excitation wavelength of 532nm and an emission wavelength of 575nm. Cy5 fluorescence was determined using an excitation wavelength of 633nm and emission wavelength of 675nm. PMT values are set over a range 675-750 V.

Example 4.7: Data Capture and Processing

Images of scanned slides are analysed using ArrayVision software (Imaging Research). Expression values for each gene are determined from the fluorescence contained in a circle around each spot and a correction applied for the background fluorescence on the slide.

Example 5: Construction and Use of Affymetrix Custom Probe Array

This example describes the design of a customised Affymetrix probe array, using DNA sequences of isolated cDNA clones. This example also describes the methodology for use of the custom probe array. This technology is referenced through the following patents/submissions: PCT/US98/22966, PCT/US98/01206, 5,800,992 patent and PCT/US94/07106.

Example 5.1: Details of Construction

All sequences were screened for low complexity regions and repetitive sequences and vector contamination's using Swat and cross-match (Copyright (C) 1994-1999 by Phil Green, University of Washington) which are based on an efficient implementation of the Smith-Waterman-Gotoh algorithm (Waterman MS, "Efficient sequence alignment algorithms", *J Theor Biol.* 1984 Jun 7;108(3):333-7).

Repetitive regions of all sequences were masked prior to sequence submission to Affymetrix by comparing all sequences against REPBASE a database containing a collection of human repetitive sequences (prepared for National Center for Biotechnology Information Contract No. N01-LM-2-3526 P.I. Jerzy Jurka, Linus Pauling Institute of Science and Medicine 440 Page Mill Rd Palo Alto, CA 94306) using BLAST version 2.0.8 (Altschul, S. et al., "Gapped BLAST and PSI-BLAST: a new generation of protein database search programs", *Nucleic Acids Res* 1997 Sep 1;25(17):3389-402) in combination with the XBLAST software (Claverie J. M. and States D. J. "Information Enhancement Methods for Large Scale Sequence Analysis", *Computers and Chemistry* 1993, 17: 191-201.). XBLAST reads each BLAST output file and generates a sequence where all segments with hits against the repeat database have been masked. This masked sequences provides better templates for the probe design because non-specific regions shared by several genes have been excluded from the submitted sequences and less unwanted cross-hybridisation's will affect the experimental results obtained with the final micro-arrays.

Example 5.2: Labelled Sample synthesis, Hybridisation and Scanning

The methodology describing the sample synthesis, hybridisation and scanning etc. for the probe array is described in detailed protocols supplied by Affymetrix. Essentially, poly(A+) mRNA is extracted and purified from total cellular RNA (5 to 100µg) using a Micro poly(A+) kit (Ambion). The synthesis of cDNA (from 0.5-5µg mRNA) is using the Superscript Choice system kit (Gibco BRL Life Technologies), and incorporated a T7-(dT)24 primer (GENSET). Purified cDNA (upto 2µg) is in-vitro transcribed using the MEGAscript T7 Kit (Ambion), and incorporates Biotin-11-CTP and Biotin-16-UTP (final conc. 1.875mM; Sigma/Enzo). Following purification, IVT cRNA is fragmented in a magnesium containing buffer at 94°C. A hybridisation mix, containing cRNA, herring sperm DNA, acetylated BSA and a MES-based buffer, is denatured and then incubated onto the probe array at 45°C, rotating at 60rpm, for approx. 16h. Following incubation, the hybridisation mix is removed and the probe arrays washed using the Affymetrix Fluidics Station. Whilst remaining on the Fluidics Station, the probe array is stained with Streptavidin Phycoerythrin (SAPE; final conc. 10µg/ml; Molecular Probes). For probe arrays having a 24µm x 24µm feature size, an additional

antibody amplification, washing and staining step is used, as follows: Following the first addition of SAPE (10 min. 25°C), the probe array is washed and then incubated with a solution containing biotinylated anti-streptavidin antibody (Vector Laboratories; 10 min. 25°C). After a further cycle of washing the probe array is stained a second time with SAPE (10 min. 25°C). The probe array is scanned, after the wash protocols are complete, using the Affymetrix scanner (570nm).

Example 5.3: Data Capture and Processing

After scanning the probe array, the resulting image data created is stored as a .dat file. In the first step of the analysis, a grid is automatically placed over the .dat file so that it demarcates each probe cell. A probe array library file (.cif, supplied by Affymetrix), defines the identity and location of each gene probe. The scanned image is then analysed using the Affymetrix GeneChip software, which generates an exportable .txt file containing expression information and characteristics for each DNA sequence represented upon the probe array as shown in Figure X.

Example 6: Details of Experiments for Microarray Profiling

There are many ways microarrays can be used to produce functional annotation of the genes included on the array. The following examples describe different experiments
5 conducted to profile mRNA expression levels using microarrays (Affymetrix and Amersham type). Such experiments form part of the strategy to identify candidate target genes (such techniques are review in the Supplement to *Nature Genetics*. 21: 1999).

Example 6.1: Tissue Distribution

10 The example describes the characterisation of the expression specificity of genes, characterised by the isolated cDNA clones. Such a pattern provides indirect information about function. A gene expressed exclusively in eosinophils is likely to be involved in pathologies associated with the eosinophil such as inflammatory disease such as asthma. Effective drugs have been developed against protein targets widely expressed in the body.
15 However, highly selective tissue expression of a drug target is attractive, as the potential for unwanted side effects may be more restricted. Knowledge of highly selective gene expression, alongside other information on a gene, can thus provide a shortcut for implicating a target in a given pathway or disease.

20 **Example 6.1.1: Commercial Human Tissue poly(A+) mRNA**

Labelled samples are synthesised from human tissue poly(A+) mRNA obtained from commercial sources (Clontech, InVitrogen). Tissues include, bone marrow, liver, kidney, brain and lung.

25 **Example 6.1.2: Purified Human Leukocytes**

Labelled samples are synthesised from poly(A+) mRNA extracted and purified from human leukocytes. Human leukocyte preparations are purified from peripheral blood essentially as described for eosinophils, and include: eosinophils, neutrophils, mononuclear cells, T cells and B cells. In some cases the purified leukocytes are stimulated/activated
30 overnight prior to isolation of mRNA e.g. T cells treated with anti-CD3 and anti-CD28 antibodies, or B cells treated with IL-4 and anti-CD40 antibody.

Example 6.2: Cell Based Models of Eosinophil Function

35 The examples describe the characterisation of the expression pattern of genes, included on the microarray, in primary cells isolated from normal and diseases humans as well-as model cellular systems. Discrete aspects of cellular function can be biochemically and physiologically

modelled in cell lines (e.g. chemotaxis or adhesion in response to physiological cytokines). Detailed profiling of gene expression in model cell lines yields dissection of the critical pathways and cellular responses, and highlights key targets. The example describes the characterisation of the expression pattern of genes, identified from the isolated cDNA clones, in cell based model systems. Such systems provide ideal models for the functional validation of candidate targets prior to further characterisation and validation in animal models etc.

Example 6.2.1: IL-5 Treatment of Primary Human Eosinophils

IL-5, like its related cytokines GM-CSF and IL-3, is a key mediator in many aspects of eosinophil functional biology (Devos R et al. *J Leukoc Biol.* 1995 Jun;57(6):813-9, Okudaira H et al. *Int Arch Allergy Immunol.* 1998 Sep;117(1):11-9). Genes which are regulated in eosinophils following treatment with IL-5 might be expected to have a role in eosinophil function.

Human peripheral blood eosinophils were isolated, as described (Example 1.1), and treated with medium containing IL-5 (1 to 100pM; R&D Systems) or media alone as a control. Following treatment (1h to 18h time points), RNA was extracted as described (Example 1.2).

Example 6.2.2: IL-5 and GM-CSF Treatment of a Human Eosinophil-Like Cell Line:

AML14.3D10

The AML14.3D10 cell line has been identified and characterised as a surrogate model cell line resembling the human eosinophil (Baumann MA et al. *Stem Cells.* 1998;16(1):16-24, Paul CC et al. *Blood.* 1993 Mar 1;81(5):1193-9). Genes which are regulated in AML14.3D10 following treatment with IL-5 and/or GM-CSF might be expected to have a role in eosinophil function.

AML14.3D10 cells are cultured, as described in Example 8, and treated with medium containing IL-5 or GM-CSF (1 to 100pM; R&D Systems) or media alone as a control. Following treatment (1h to 18h time points), RNA is extracted as described (Example 1.2).

Example 6.2.3: Adhesion of AML14.3D10 to Fibronectin

The critical process of adhesion by an eosinophil has been modelled in AML14.3D10. The model system is described in detail in Example 8. Following adhesion (approx. 1h), the adherent and non-adherent AML14.3D10 cell populations were harvested and RNA were extracted as described (Example 1.2). In some experiments, non-adherent cells are harvested at time points upto 48h post-adhesion.

Example 6.2.4: IL-5 Withdrawal from IL-5-dependent Cell Line: TF1.8

Withdrawal of IL-5 from the IL-5-dependent Cell Line: TF1.8 is described in Example 8 relating to Validation. Following IL-5 withdrawal (time points between 15 min. and 48h), cells are harvested and RNA is extracted as described (Example 1.2).

Example 6.2.5: Eotaxin Treatment of Primary Human Eosinophils and AML14.3D10 Cells Expressing Human Eotaxin Receptor CCR3

As eotaxin, is a key mediator in many aspects of eosinophil functional biology (Graziano FM et al. *Allergy Asthma Proc.* 1999 May-Jun;20(3):141-6, Corrigan CJ et al. *Clin Exp Immunol.* 1999 Apr;116(1):1-3). Genes which are regulated in eosinophils following treatment with eotaxin might be expected to have a role in eosinophil function.

Human peripheral blood eosinophils, or AML14.3D10 cells, isolated and cultured respectively, as described (Example 1.1 and 8.5), were treated with medium containing eotaxin (1 to 100pM; R&D Systems) or media alone as a control. Following treatment (1h to 18h time points), RNA was extracted as described (Example 1.2).

Example 6.3: Clinical Study with Peripheral Blood Eosinophils from Normal and Asthmatic Individuals

This example describes mRNA expression profiling for human peripheral blood eosinophils from normal and asthmatic individuals from a defined clinical background.

Diversion from normal physiology is frequently accompanied by histological and biochemical changes, including changes in gene expression. The up- or down-regulation of gene activity can either be the cause of the pathophysiology or the result of the disease. The comparison of expression of thousands of genes between 'disease' and 'normal' tissues and cells allows the identification of multiple potential drug targets. Targeting disease-causing gene products is desirable to achieve disease modification, while targeting genes that are expressed as a consequence of disease can lead to alleviation of symptoms.

The following groups are identified and clinically characterised:

1. controls normal volunteers
2. atopic non asthmatic volunteers
3. mild atopic asthmatics >80% predicted FEV1

4. moderate atopic asthmatics 60-80% FEV1
5. severe asthmatics (atopic or otherwise) < 60% FEV1.
6. atopic: positive skin and rast test. PC20 histamine, > 2mgs//ml
7. asthmatic: hyper-responsiveness, PC20 histamine, < 8mgs/ml, wheeze, cough,
- 5 bronchodilator reversible, probably atopic.

RNA was extracted as described (Example 1.2).

Example 7: Data Normalisation, dB Storage and Visualisation

10 This example describes the process by which expression data (typically .txt files) from Amersham or Affymetrix microarray experiments was normalised, stored and visualised.

Example 7.1 Data Normalisation

15 Data was normalised using a number of methods depending on the type of data that is being processed. The first method involves a global normalisation method where the total intensity for all genes on the microarray was scaled to the same overall level to give a scale factor that is used for all genes on the microarray; this is done for all microarrays within a single experiment. This method works particularly well when comparing changes within a single cell type under various conditions or where it is expected that only a small number of
20 genes will change from experiment to experiment.

The second method involves normalising based upon the use of genes that are known to be invariant under most cellular conditions (house-keeping genes) such as GAPDH
(Glyceraldehyde 3-Phosphate DeHydrogenase), actin or certain ribosomal proteins. For this
25 approach, the levels of the house-keeping gene being used are scaled to the same value for all microarrays within a single experiment giving scale factors that can be used for all other genes on those microarray experiments. This method works well where a large number of genes are expected to change within the experiment.

30 The final method scaled all the expression levels of the genes on the microarray, in each experiment to a common data set, such as that obtained in an experiment performed on liver cells. The genes used for normalisation are those found to be present within the liver, with the exclusion of the top 10% . The ratios of the expression levels of each of these genes are calculated with respect to the liver experiment, the geometric mean taken and used to
35 normalise the data sets. This approach has the advantage of being used in the large majority of experiments and can be used for cross-tissue comparisons.

Example 7.2 Data-Base Storage and Visualisation of Data

The data is stored in a relational database (such as Microsoft Access or ORACLE) that contains the normalised expression levels and a call as to whether the gene appears to be absent or present (Affymetrix only). This data is then associated in the relational database with annotation for known genes from various other DNA and protein databases. These databases include EMBL (GenBank)TM, Swiss-ProtTM, TrEMBLTM, Incyte LifeSeq Gold® and the Derwent patent database. Information that is included is a description of the gene, keywords associated with that gene, tissue distribution and protein function annotation, HTML links to the online database entry, and an indication of the quality of the match between the gene on the microarray and the DNA/protein database entry as measured using Blast (version 2.0.8) statistics.

The data can be queried using the SQL query language in the relational database, where the information for the genes of interest can be extracted. This data can then be visualised using various data-mining software products including SpotFire on a personal computer and MineSet on a Silicon Graphics workstation. In addition to multi-dimensional visualisation, MineSet also has algorithms that can cluster genes according to, for example, similar expression profiles or tissue distributions.

Example 8: Functional Characterisation

This example describes how the gene sequences of the present invention can be further characterised with respect to protein structure the function, eosinophil biology and by inference function in other leukocytes.

Example 8.1: Delivery of antisense oligonucleotides to cell lines or primary cells

Antisense oligonucleotides of up to 20 nucleotides in length for any single gene sequence are designed as described previously along with an appropriate, inactive, control; oligonucleotides comprising the same nucleotide components but in a scrambled order or by inverting selected sequential oligonucleotides. These oligonucleotide sequences are additionally modified (e.g. methylphosphonate backbone or 2' methoxy modifications) for stability in the molecule. Oligonucleotides are resuspended in water at a concentration of 200µM. Oligonucleotides are delivered to cells in culture using commercially available lipids, for example Eugene 6 (Roche Molecular Biochemicals) or Superfect (Qiagen) or other, as per manufacturers instructions, or by using RPR proprietary lipids. Specifically oligonucleotides are diluted to the desired concentration (1-1000nM) and complexed with the lipid at the manufacturers recommended ratio.

Oligonucleotides are delivered to; primary human eosinophils, or other leukocytes, or other cell lines cultured in TF1-8 - RPMI-1640 with 10% heat inactivated FCS; 100U/ml penicillin and 100mg/ml streptomycin; 1mM sodium pyruvate and 2U/ml recombinant human IL-5
5 AML14.3D10 - RPMI-1640 with 10% heat inactivated FCS; 10 μ M β -mercapto ethanol and 1mM sodium pyruvate at 2-4x10⁵ cells/ml then incubated at 37°C for up to 7 days. The impact of the antisense oligonucleotide on target gene transcription is assessed by quantitative PCR. RNA is prepared from transfected cells using the RNeasy miniprep kit (Qiagen) as per manufacturers instructions. Levels of target and an internal control mRNA are then
10 determined using the TAQMAN technology as detailed below. The impact of the antisense oligonucleotide on target protein expression is assessed by Western blotting by standard procedures (Maniatis *et al.*(1989) in Molecular Cloning - A Laboratory Manual, CSH Laboratory Press) The impact of the antisense oligonucleotide on functional biology is described below.

15

Example 8.1.2: Retroviral delivery of gene sequences to cell lines or primary cells

Gene sequences in a sense or antisense orientation are delivered to cells of interest using either of two retroviral systems. The first system, the Phoenix MMLV system (Pear *et al.* (1993) Production of high-titer helper-free retroviruses by transient transfection. PNAS(USA)
20 90, 8392-6) utilises a PhoenixTM packaging cell line (cultured in DMEM + 10% heat inactivated FCS) in order to produce replicative-incompetent MMLV particles containing the gene of interest. The gene of interest is cloned into a packaging vector, for example pBMN (Pear *et al.* (1993)) and transfected into the Phoenix packaging cell line by calcium phosphate precipitation. 20 μ g plasmid DNA is precipitated with calcium phosphate using the Promega
25 Profection system as per manufacturers instructions. This precipitate is added to 10⁶ cells in 3mls medium. Cells are incubated at 37°C for 5-7h, then the medium is changed and cells incubated for a further 24h. Medium is changed again and cells incubated for a further 48h. The supernatant is transferred to a 15 ml falcon tube and cellular debris removed by spinning at 800rpm for 5 minutes. The supernatant is then filtered through a 0.45mm filter, aliquotted
30 in cryogen tubes and stored at - 80°C. The virus is then titred to assess the number of infectious particles. Target cells of interest are then infected with the viral particles at a suitable multiplicity of infection.(1-100) by adding the virus in a final volume of 1ml to 10⁵ cells in culture medium + 8 μ g/ml polybrene. The cells and virus are then spun at 2500 rpm for 90 minutes at 32°C. Medium + 8 μ g/ml polybrene is added to a final volume of 2mls and cells
35 cultured at 37° C overnight. The medium is then changed and cells incubated for a further 48h. Alternatively, the gene sequence of interest is introduced to target cells using a lentiviral

system developed by Oxford Biomedica Limited (Kim *et al.* (1998) Minimal requirement for a lentivirus vector based on human immunodeficiency virus type 1 J. Virol. 72(1) 811-6). The sequence of interest is cloned into a lentiviral genome vector, for example pH4 or other and this plasmid is transfected using calcium phosphate precipitation as described into an efficient packaging cell line (293T cells) licensed from Stanford University, together with vectors encoding accessory *gag/pol* and *env* proteins such as pGP-RRE3 and pRV67. Virus is then produced over a period of 72h as described for the PhoenixTM system. Viral particles encoding the gene of interest are harvested from the cell culture medium as described above then titred to assess the number of infectious particles. Target cells of interest are then infected with the viral particles at a suitable multiplicity of infection (1-100) as described above.

Example 8.1.3: Quantitation of Target mRNA Levels

Target mRNA levels are determined pre and post antisense oligonucleotide delivery to cells or cell lines by TaqMan (ABI PRISM 7700) quantitative RT-PCR analysis. Cytoplasmic RNA is isolated using the RNeasy 96 Kit (Quiagen) as per manufacturers instructions with the inclusion of the manufacturers recommendation regarding on column DNaseI treatment. For each treatment, 10µl of the resulting RNA is reversed transcribed using the TaqMan Reverse Transcription Reagents Kit (PE Applied Biosystems) as per manufacturers instructions. 5µl of this is added to a 25µl final TaqMan PCR reaction mix (TaqMan Universal PCR Master Mix, as per manufacturers instructions). Target RNA quantitation is carried out using the relative standard curve methodology as described by PE Applied Biosystems and normalisation is carried out using a reference gene, for example GAPDH. Target RNA TaqMan primers/probe sets are designed using the PE Applied Biosystems Primer Express Software.

Example 8.2: Functional Assays

The impact of the genes described on functional biology of eosinophils, other leukocytes and model cell lines is evaluated by monitoring the impact of such genes on a number of functional biological and biochemical assays. Assays (for example adhesion, apoptosis, or calcium mobilisation) have been configured which are characteristic of the primary eosinophil or other leukocytes, in both primary eosinophils or other leukocytes per se, and in cell lines (for example AML14.3D10 (Baumann *et al.*, Stem Cells, 1998;16;16-24), TF1.8(a gift from Prof. C. Sanderson, Institute for Child Health Research, Perth, Australia), HL60 (Tomonaga *et al.*, Blood, 1986; 67:1433-1436) and EOL-1 (Mayumi, Leukemia and Lymphoma, 1992; 7:243-250)). Potent antisense molecules that knockdown target mRNA

levels are identified (see above) and transfected into an appropriate cell line, for example AML14.3D10, and a functional assay is performed (for example an adhesion assay or an apoptosis assay) at an appropriate time post transfection, for example 72 hours. Assays are performed with the appropriate scrambled control antisense oligonucleotide simultaneously, as an control. Similarly assays are carried out using cells in which candidate genes have been delivered in a sense orientation to evaluate over-expression or in an anti-sense orientation to identify any anti-gene effects.

Example 8.2.1: Adhesion assays

Adhesion assays are carried out using cells or primary eosinophils and looking at adhesion to a variety of substrates including plasma fibronectin (100µg/ml) cellular fibronectin (100ug/ml) coated on tissue culture plates, or to primary human endothelial cells. In a 96 well plate, 100µl of a 100µg/ml solution of fibronectin is added to each well, and equilibrated for one hour at 37°C. The wells are washed with PBS/1%BSA (bovine serum albumin) and then blocked non-specifically with a solution of PBS/1%BSA for one hour at room temperature. 2×10^5 cells in Puck's Buffer (Pucks Buffer (Sigma) /0.1%BSA / 2.5mM $MnCl_2$) are bound to fibronectin coated plates or to confluent endothelial cells for one hour at 37 degrees celcius. Unbound cells are washed off (3 times) with RPMI containing 1% BSA and the bound cells lysed in mammalian lysis buffer (Promega) as per manufacturers instructions. Quantitation of bound cells is carried out using PicoGreen Nucleic Acid detection (Molecular Probes) as per manufacturers instructions. In this way genes are identified that enable or inhibit adhesion beyond the normal range and such genes are therefore implicated in the regulation of the adhesion process.

Example 8.2.2: Apoptosis Assays

Apoptosis assays are carried out using primary eosinophils or other leukocytes or cell lines including TF1.8 and AML cells. Apoptosis is monitored by caspase 3 activation or annexin V externalisation. Caspase 3 activation is measured using a CaspACE™ kit (Promega). Cells are harvested following antisense or retroviral treatment and pelleted by centrifugation (8000rpm for 5mins) Cell pellets are lysed using lysis reagent and caspase-3 enzyme activity monitored by production of a fluorescent substrate using a fluorescent plate reader as per manufacturers instructions. Annexin-5 is measured using the ApoAlert™ Annexin V apoptosis kit (Clontech). Cells are harvested following antisense or retroviral treatment and processed using an Annexin5 detection kit (Clonetech) as per manufacturers instructions. Cells are then fixed in 2% paraformaldehyde and analysed by flow cytometry.

Example 8.2.3: Chemotaxis assays

Chemotaxis assays are performed with eosinophils or other leukocytes or cell lines as described by King et al, J. Leuk Biol, 1997;62:465-8.

5

Example 8.2.4: Activation Assays

In response to a range of stimuli eosinophils and leukocytes generally will be activated in a number of ways as specified below.

10

Example 8.2.4.1: Eosinophil Peroxidase

EPO assays are performed for the measurement of EPO release in response to activation. 5×10^5 cells are incubated in HANK's buffer in the presence of activator, such as Histamine for one hour at 37°C . The supernatant is harvested and EPO concentration is determined by the method of Strah et al (J Immunol Meth, 1985; 83: 209-15).

15

Example 8.2.4.2: Respiratory burst

This assay is carried out using lucigenin as a substrate Cells are cultured in a six well plate at $5 \times 10^6/\text{ml}/\text{well}$ in standard medium. After a 24hr cells are washed three times in HBSS with calcium(Sigma +BSA (0.2%), HEPES (10mM), sodium bicarbonate (7.5%)) and seeded at $5 \times 10^4/\text{well}$ into a white microlite microtitre plate containing pre-warmed lucigenin [50 μM]. Cells are incubated for a further 30 minutes in a luminometer (ML3000 Microtiter Luminometer, Dynatech Laboratories) prior to addition of a prescribed stimulus at time zero.

20

Example 8.2.4.3: CD69 Expression

CD69 expression is employed as a marker of activation. 5×10^5 cells are incubated overnight in culture medium plus activator, for example Histamine. After overnight culture, the cell suspensions are centrifuged and the pellets are resuspended in cold RPMI-1640 (Sigma) and placed on ice for immunofluorescence staining and flow cytometry. This was performed as per Hartnell et al., Immunol, 1993; 80: 281-6.

25

30

Example 8.2.4.1: Cytolic calcium

An elevation in cytosolic calcium is measured using a fluorescent calcium indicator dye such as Fura-2, Fluo-3, etc (Molecular Probes; Kao (1994) Meth Cell Biol 40 155-81) Calcium mobilisation assays on antisense treated or retrovirally targetted cells are carried out in two formats following loading of the cells with a fluorescent calcium indicator. For example cells in assay buffer [HBSS with calcium(Sigma +BSA (0.2%), HEPES (10mM), sodium

35

bicarbonate (7.5%)](are loaded with 3 μ M fluo-3 AM for 45min at 37 °C . Loaded cells are then washed three times and harvested into a 96-well plate (0.5 x10⁶/300 μ l). Agonists are micro-injected into the wells and change in fluorescence measured using the FLUOstar®(BMG Lab Technologies). Alternatively cells are monitored for changes in calcium in a Perkin Elmer dual excitation spectrophotometer using single assay cuvettes.

Other activation assays that may be employed to assess the impact of genes of interest include the use of a microphysiometer [Molecular Devices] to measure proton extrusion from the cell, eicosanoid production including prostaglandins and leukotrienes [measured in cell supernatants by ELISA or other immuno-assay]; and the production of known cytokines.

10 *Example 9: Antibody Production and Immunohistochemistry*

Anti rabbit polyclonal peptide antibodies are produced to targets based on predicted peptide sequence and tested for their ability to react with protein via ELISA assay and by Western Blot using whole cell extracts (Maniatis et al (1989), in Molecular Cloning, A Lab Manual, CSH Laboratory Press, Second Edition). Reactive polyclonal antibodies are used to carry out immunohistochemistry on a wide range of human tissues and to compare the expression of a specified gene in diseased versus normal, tissues, for example in asthmatic lung versus normal lung or in any other inflammatory disease tissue.

CLAIMS:

1. A polypeptide encoded by a polynucleotide according to any one of Seq ID Nos: 1-466 or a fragment the polypeptide.
- 5 2. A polypeptide variant having at least 90% amino-acid sequence identity to the polypeptide sequence of claim 1, and sharing at least one functional or structural characteristic with the polypeptide sequence of claim 1.
- 10 3. An isolated polynucleotide which encodes the polypeptide of claim 1 or 2.
4. An isolated polynucleotide comprising the polynucleotide sequence of any one of Seq ID Nos: 1-466, or a fragment thereof.
- 15 5. An isolated polynucleotide variant having at least 90% polynucleotide sequence identity to one of the polynucleotides of claim 3 or claim 4.
6. An isolated polynucleotide which hybridises under stringent conditions to one or more of the polynucleotides of claim 3, claim 4 or claim 5.
- 20 7. An isolated polynucleotide which is complementary to one or more of the polynucleotides of claims 3 to 5.
8. A method of screening for agents which modify the activity of one or more of the polypeptides of claims 1 or 2, comprising the steps of a) exposing the polypeptide to at least one agent to be screened; b) detecting and/or measuring interaction and/or binding between the polypeptide and the agent.
- 25 9. An agent identified according to the method of claim 8.
- 30 10. An expression vector comprising one or more polynucleotides according to claims 3 to 7.
11. An expression vector according to claim 10, wherein the polynucleotide is operatively associated with an expression control sequence which permits expression of the polynucleotide in a host cell.
- 35

12. A host cell comprising an expression vector according to claim 10 or 11.
13. A method of producing a polypeptide encoded by any one of the polynucleotides of Seq ID Nos: 1-466, the method comprising the steps of a) culturing a host cell of claim 14 under
5 conditions suitable for the expression of the polypeptide from the polynucleotide; and b) recovering the polypeptide from the host cell culture.
14. A method of producing a polypeptide encoded by any one of the polynucleotides of Seq ID Nos: 1-466, the method comprising chemical synthesis.
- 10 15. A method of producing a polypeptide encoded by any one of the polynucleotides of Seq ID Nos: 1-466, the method comprising a) transforming an animal with an expression vector according to claim 10 or 11; and b) recovering the polypeptide from the transgenic animal.
- 15 16. A pharmaceutical composition comprising one or more of the polypeptides according to any of claims 1 to 2, and a pharmaceutically acceptable vehicle.
17. A pharmaceutical composition comprising one or more of the polynucleotides, or fragments thereof, of claims 3 to 7 and a pharmaceutically acceptable vehicle.
- 20 18. A pharmaceutical composition comprising a vector according to claim 10 or 11 and a pharmaceutically acceptable vehicle.
19. One or more polypeptides or fragments thereof according to claims 1 or 2, for use in the
25 treatment of eosinophil mediated inflammatory disease.
20. A pharmaceutical composition according to claim 16 for use in the treatment of eosinophil mediated inflammatory disease.
- 30 21. Use of one or more polypeptides or fragments thereof according to claims 1 or 2 in the manufacture of a medicament for treatment of eosinophil mediated inflammatory disease.
22. Use of a pharmaceutical composition according to claim 16 in the manufacture of a medicament for treatment of eosinophil mediated inflammatory disease.
- 35

23. One or more of the polynucleotides, or fragments thereof, of claims 3 to 7 for use in the treatment of an eosinophil mediated inflammatory disease.

5 24. A pharmaceutical composition according to claim 23 for use in the treatment of eosinophil mediated inflammatory disease.

25. Use of one or more of the polynucleotides, or fragments thereof, of claims 3 to 7, for use in the manufacture of a medicament for the treatment of eosinophil mediated inflammatory disease.

10

26. Use of a pharmaceutical composition according to claim 22 for manufacture of a medicament for treatment of eosinophil mediated inflammatory disease.

15 27. A pharmaceutical composition according to claim 18 for use in the treatment of eosinophil mediated inflammatory disease.

28. Use of a pharmaceutical composition according to claim 18 in the manufacture of a medicament for treatment of eosinophil mediated inflammatory disease.

20 29. A purified antibody capable of binding to any one of the polypeptides of claims 1 or 2, or fragments thereof.

25 30. A kit for diagnosis of disease characterised by inflammation, comprising means for assaying expression of a polynucleotide or polypeptide according to any one of claims 1 to 7 in a sample of eosinophils from a patient.

31. A method of modulating apoptosis of eosinophil cells in a subject, comprising administering to the subject a polynucleotide according to any one of claims 3 to 7, wherein said polynucleotide sequence is operably linked to a regulatory sequence.

30

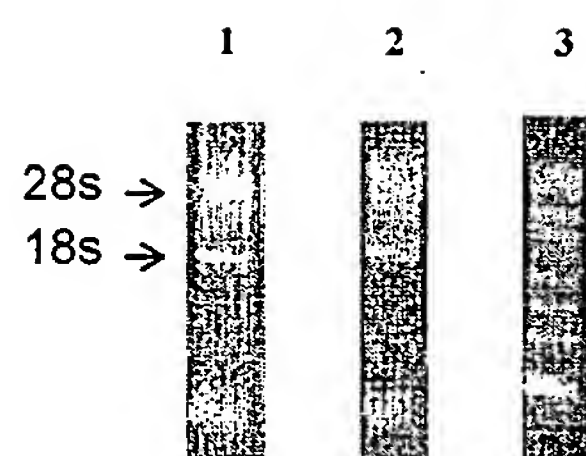
32. A method of diagnosis of disease characterised by inflammation, the method comprising a) obtaining a sample of eosinophil cells from a patient; b) assaying said sample for levels of expression of a polynucleotide according to any one of claims 3 to 5.

33. A method of diagnosis of a disease characterised by inflammation, the method comprising a) obtaining a sample of eosinophil cells from a patient; b) assaying said sample for levels of a polypeptide according to claims 1 or 2.

34. A method of inhibiting eosinophil migration in a subject, the method comprising
5 **administering to the subject a polynucleotide sequence according to claim 6 or 7.**

35. A transgenic, non-human animal comprising a recombinant polynucleotide having a sequence according to any one of claims 3 to 7.

36. An agonist or antagonist of the polypeptide of claims 1 or 2, wherein said polypeptide is a receptor.

Figure 1

Gel analysis of RNA isolated using the RNazol modified methodology.
(Lane:1 Eosinophils, Lane:2 Neutrophils, Lane:3 Molecular weight marker)

Figure 2

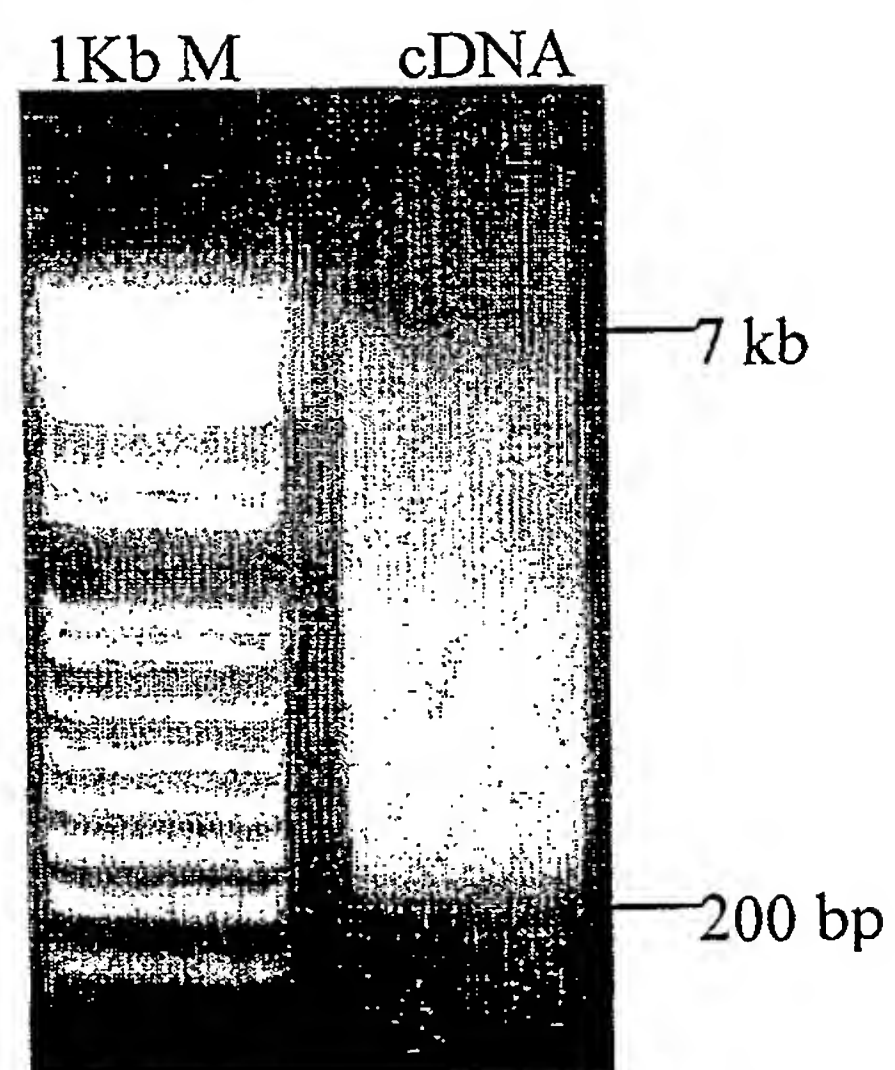
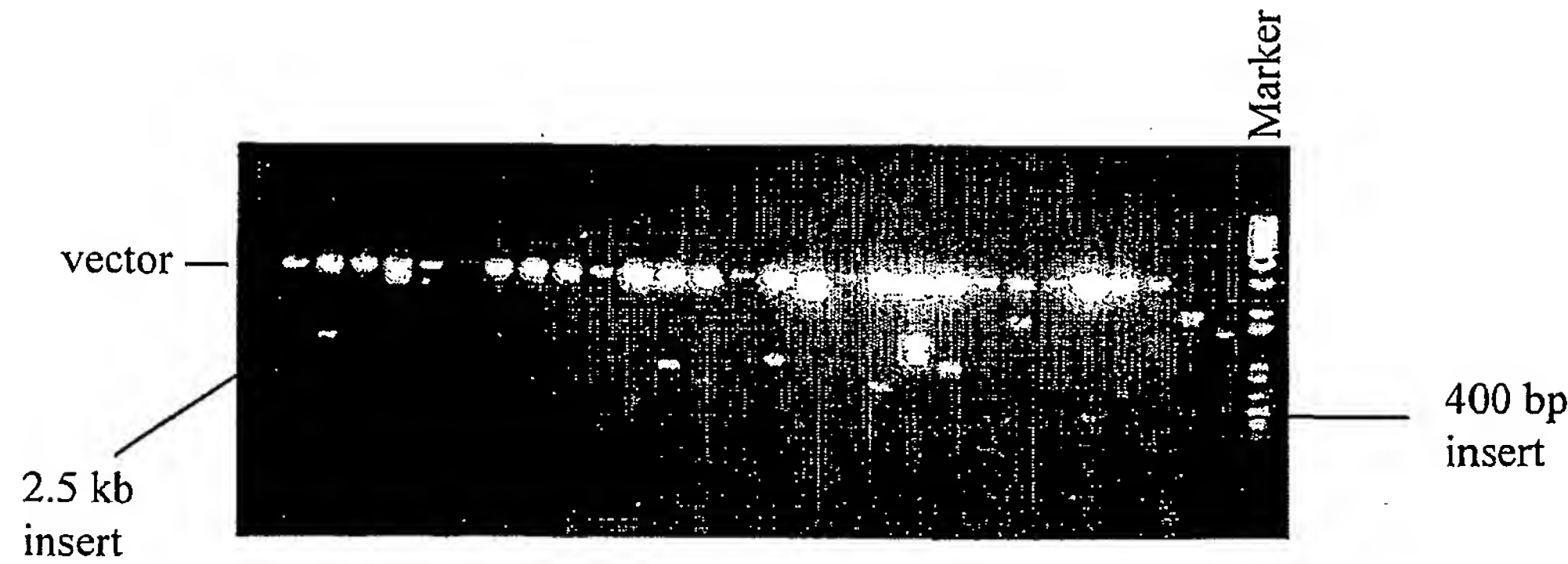


Figure 3



5

Figure 4

AscI

5' AAGCAGTGGTAACAACGCAGAA-GGCGCGCC-T(18) (A/G/C) 3'

NotI

5' AAGCAGTGGTAACAACGCAGAA -GCGGCCGC-GGG 3'

Figure 5

5' - GGGCGCGCCTTAATTAAG - 3'
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aacttgaaga agaaatattt aatacactag tatttgatat taagagcaat aattttctgt	360
cactttaagt aaaagctttc taattcattt ctccatcctt aacattacac acacataata	420
tcaaagttag gaaaaataag tagaataaaa tgggtttttt ctcttacaga ctccagagt	480
tggttggtaa tga	493

<210> 4

<211> 673

<212> DNA

<213> Homo sapiens

<400> 4

gggacaggag ccaagagaga aaactgtccc tgaaaaaggt atcatcttct aacgcaagt	60
tggggtcgtt tttggacagc cattttggac aagctctggc ctcttgtaa atgtgacata	120
ctgagtcaga ggcagacgtc cttctgtggt tattegcttc ctgtctgatt aatttgttgt	180
ttgttggtcc ttctccttt gctgcagaaa aagaaactag attggttttg cttagaagc	240
aagcaagaaa aaaaacctaa attaaaaaaaa attaatgtt tctcctcccc acaagggtga	300
atacacagct atttggtaca gtgacaagag gagatgagca cctccactca gtgaagagtc	360
caactttatt ctagatattc ccacaaaaat aactgttcat ggaacttgag attcctttag	420
gaaaattata tttgaaagta tcaactgtaa tactgactat tccattgagt aatagggaaa	480
agagtcactc aagaaagaaa agctcttacc taccttacct tategcttca ttaggctaag	540
ggcttcttct catttacagg gcattcaagt gtgtggggag aaagttacaa atgcaggtaa	600
agagagcagg tcagggtgtat gaaggcaaat gagggctttt ttttggttg gttttattta	660
tttctttttt ttt	673

<210> 5

<211> 624

<212> DNA

<213> Homo sapiens

<400> 5

gggggatgag ggttgagag aggagggcac tcaagaggcc tcagtgagtg tgacccttgt	60
aaggagacct ccttctgtag ttctacaaa aagcataggc acagagcaat gaaacaacct	120
gctgtgccag ggaactgcaa ctaggcgggg cttttctggc ataaggaata tggggtggag	180

tgtgggaaga ggtgaaggtc tggaggcttc tgaccttcca ggattcatgt ggatgcctta 240
 catcttagcc catccatcac aatcctctgg aaaactaaaa taaattatta ttctttcttc 300
 tattactaat tagttttggt ttaagcatat caacttattg ttaatcattc atacaggagg 360
 ttacaaaagg aaaagtcaaa gctgtttttg ccacttctat atctaaccac ctagtcctac 420
 tcagctgtag aatatgttac aaaaactctc agaagtgctt ataggtatca agcattattt 480
 cttctgtctg cttattatgt atttatataa gactattgac ttatttatat taattttgta 540
 tgctacctct ttaccaaatt ctcttattat ttatattaat ttctccattt acttttgttt 600
 tctttttttc tctcttttgg aaca 624

<210> 6

<211> 512

<212> DNA

<213> Homo sapiens

<400> 6

acggtgtttt tgtgtttggg aggtgtttta gttttgactt ctgctctaaa accttgctct 60
 ttattaggct ttagcgatgc tgtagtgaa gccttgctctt acattgtctt ctctttaagg 120
 aatagagtat tgcttcttca gctaagtatg cttttgttaa tagccacatt tcttctgctc 180
 tgggttaagc taggtacatg caattataaa cttttgtgt cccatagcaa gagcagtttt 240
 ccttggaat caccgagacc ctcaattttt ttgcaagga aacttttata ggctaattca 300
 ttaccccat ccccaaattc tacttttcac aataggaaaa tgcatagtgt gtttagctgt 360
 gaaaaaaaaat tagccgactg tggcctcatt aactgcacct ctttcggcaa atttgatttt 420
 gcatttcatt ggcgattttt acatttttga taatctacat gttttcaaaa aattgatttc 480
 ctggaaattt aatcaaaaac agggttgggg aa 512

<210> 7

<211> 673

<212> DNA

<213> Homo sapiens

<400> 7

gggaagtact cgcatgcacc catcttagct ctgagacgac acaacctgaa cggaaaatct 60

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tgcggctcct ggcgccagca ggcctgtggt tggctccttc ctgttctaata taccacttg 120
aaaacctgaa gacttgggct ccaatccact tggcaatcag accatctcct tggcccatct 180
gcctgcaact gcacacctcc ctttctgggg ctgcatttct ttctcctgta tccagtcttc 240
gggaagatct tacgatttgt acctgtctca attactcccc tatcacagaa aattccaacc 300
ttactggcac tgcactataa actcgtattc cttcctagac tcagctagag aaaaacaaca 360
gtatttgcaa gagtggtcga agacctgagt gctttattac tgataatttt ttaaatagaa 420
aaagtgagtt ctccccttgg tttctgtcag aatcagaaat cctgcactgc aaagacagtc 480
tttggaatc tcagtaccac ttcactagta ctttggagga cactgttcta aaaggcacag 540
cctgggacca tacttgtcac agcaagtttg ggctcatgcc ctgagcatgt accaaccgcc 600
caaggtaca cacgtggctg gtccatccc cacttctctt ttgtttctgg acttgttttg 660
ctttgttttg gtt 673

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<210> 8

<211> 410

<212> DNA

<213> Homo sapiens

<400> 8

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ggggggtgct ggttgtgaca ggggtgcagta aaattgactt catatacaaa gcctgtaatt 60
ttaggcgaaa tggaagcaga aatctaggaa gttgtgcttg cttgtatgtt gagtttggtc 120
ttaaactaag gaacgtatta aaattcatct ttgtataacg tccaataatt taggactctg 180
attcactgac caaaagtcag tgttgcagag atttctctac cccgtatggg attttggttag 240
attgttcaac actgaagcac atgattgaga acatcttggg acagaccaa accactgaca 300
tatgggaaag acagatgcac cttatttcct tccataaatt tgatggagaa taagattctc 360
tacatactca ctgtacccat cctctttcag tttgctgtta tcactgtat 410

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<210> 9

<211> 638

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 9

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ggggaacttg catatagata ttaaaataag atccaaagag ctcacaagga gaatgctgga      60
gaagaaaatc ttcataatttc tatataaaaa cgtacacatt tcccccatag ataattccag    120
taacttaaaa atgaccaaaa aaaaaaaccc atccttctat aaaatcatct aaagatctaa    180
aggtagaagt tgcaggggag agggataggg gaaaatacaa aactatccgc tagtttgctt    240
aatttggaag ataactccat aaataaatat ttgcaaagga tagtcaactc ttgacccttg    300
gtactagaga gtgtcaggga attctccaag ctggatgnnn nnnnnnnnnn nnncccttcta    360
ctcgtctcca ttcttgtagc cccaaattgg ctgagcagga gaagcaactc tcagagggttc    420
tctaattgtg aggaagtaat ttttctcaat gcctatcacc ttaaaagcca tttctttcat    480
cacaaaaaaa tgaaagtagc agctaccagc caaagaaaag gaaaccaa at cacattttgt    540
aacctagcct aatttacttc tacacaacag aaaaactgat cctgcactct cttctctcct    600
agtctcctcc tacaaaatag catctccctg ttaaagtc                                638
```

<210> 10

<211> 611

<212> DNA

<213> Homo sapiens

<400> 10

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ggggactccc tgtggccac agaacaaagt ttggaattcc caatcatctc atacgaacag      60
actcttgagt ctaatcccc acctccaagc cttgggccac agtcacagag tgggctgtaa    120
ttcacgtgca gccgcagagc tacaggagtt tggtcgtagg ggcagcactg cagagcctct    180
gtctcccttg ttagagtagc tgagccaggc ttttggccta taagggtgaa gcaaggggtgt    240
gagtgaagcc tgcgtgggag caattctcca ggggaaacat ctgccctcca tgggaatgct    300
gtgtgctgtg atgtgtctcc ccaggctctg ccaccactcc agtgcaccaa actgctgctg    360
tgggaaggag ccaggagagt gataacttgg ggtaccattc cccatctgtt tctggggagc    420
```

ctgctgcagt actactctct ggtctgccct ggaaaaaccc agaagcatac tgcatacacag 480
cttgagaaat tacatctata gggggagcag ggagctagat accaagaata ccaagaatat 540
gagggatacc cgtggaactg gtgctgggag aagttatcca gccagggttg agctgggtag 600
gcctgagctg t 611

<210> 11

<211> 644

<212> DNA

<213> Homo sapiens

<400> 11

gggacaacag gctgttgcag tgaatccaaa tctgttacca gactgatttg gttcaaaatg 60
gccaaaaaga ataaagtaaa cggcagtaca tttcatagac agaaccctat gtctaggaac 120
caagaatcct cttgattcat caggctacaa tataactcgg cctccagcaa caacttaatg 180
tatcaaaatc agaaatatac gtacacgatg cagcgactgg ctcagggtgtg tagcattact 240
atcattggga aactatttct gtcaaactgt aaagtgaag caaactgggt tcttgacctg 300
aatttcatgg aagtctaaac aactcatta ctgtacacag gagtcgcccc aaacaaacat 360
cacacatctc acttctgcct cagcaacggc ggcgaccctg ggttccccta cagagatcag 420
aggagaggag aggacaggac acagccccac cctcttgcca aagggtccac agccgtttcc 480
acaggccacg tgtttccccc tgatcccaga ctccctgccc gctgtgggac ggaactacag 540
ggcaaaccgg cgccatcacc tgtctccacg ctccctgaag gctgctcgtc tctcctaagg 600
tctttggcca cagttcctgg gcaactcaaa agcctgacga tagg 644

<210> 12

<211> 612

<212> DNA

<213> Homo sapiens

<400> 12

gggactgagg gggccgccct ctgctttcaa ctgtccacat catcccaagg agactcgctt 60
ctaattatct taataaagtt cttgtcataa aacctttttc tttggacaga aaaacacatt 120
tccagccatg cttttggtgt ggatttttaa gccaaagacct ttttcaatga gaaccacagg 180
cgttttgtgt ggacgctgtg tccttggcga ggcactctga ctgctgcttt gcagcgagcg 240

cacgtggagg ctttacttcc ccactttgaa gtgctgctga gctattttac ttctaattccc 300
cctccaaaaa gaagtcctgt gaaaatcgcc gttaaataa gttcatacca agagagtctc 360
tgctgtctag gcttggtgtg tgggtgttgcc tcaaagccag tcaaaacaaa atgggaaaga 420
tgagcccagg ctggtgggca ctggcacgtc ggccacacgt gaggtgcgt ggggcacagt 480
cggatgcacg tgccacaca ctcatTTTca ttttactggg ctcaacaccc tctaggttgt 540
gatcccaaac acctgctaga cataagaagg tcagaacgtg aggtgcatga gtgcaccttc 600
agcaccggtt tg 612

<210> 13

<211> 731

<212> DNA

<213> Homo sapiens

<400> 13

gcgggtaaag tacttaaagg aaaaaaaaaat gcctctggga tatctcatga attaattcat 60
aaacaatctt tgccttgcag acctctacca tttttgaaag cccaggaatt tcttaatata 120
tgacagttgg cagaggtagt gataagaaag attagcaaag ctccaaacca gaaacaatct 180
cttggctcca aatagtctca tatttttaaaa attgaaatta aacctagttg gaggaaatca 240
gccatagtga tttttcagtg cccagggagt gggaaagtaa catgacattc tctaccacca 300
gatgtagggg atttggcctt tttcctttgt tgaaaaatat taaatgctaa accatcattt 360
taaacctcaa agacttttcc ttcttctgtg atgtaacctt tctgtaaact ctggccatcc 420
ctgccatgtt tcacctgga acaccaagc ttttacttga aaaacaggca agactctcat 480
tctggggcag gaataatgac attcaaacag cttaaacacc aaggattgtt gggagctgtc 540
acatgcagtt agctgagaaa tacaactcat cctgacgagt caggtaatga catgaagcac 600
aggcagccac tcaactctgac cagacacctg aagccattga ctcatgtaca ggacacatta 660
agcctcatct ctgctaacag atttacttac ccgatgataa caactttctg cagcagtcag 720
agtgagcatt t 731

<210> 14

<211> 752

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 14

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gggtttacat acagatggca aacttcattt cctttttctc ttaatgcaac aaggtcatcc      60
caagatcagg cttccttcag tttctgtggt aagtagtgat ggacacttat ggagttttca     120
gagacttatg cattgggtaa caaggcactg caagaaaccc cagatagcac agcatcatct     180
cacatttaca ccacatcaca tcaacatcga tgctaggagg tctaaagctg nnnnnnnnnn     240
nnnnnnnnnn nnnntccaaa agactccact catgacacca gctcactcct gagtcacatc     300
agcccccttc agagtcacag ccccgaaact aaggctatcc atatgggttg attatacaat     360
ccaaaaagca gtcctcaaata ttagaaacac ttatttgtct ggcagacaca ttccctaatt     420
taaagcctct tatactgtgc ttaaaaatat tcaacagtct tagcaaatg acaaaataaa     480
caggtagcag ccatgggggtg ggcagggtta ggtggcgttg aaagaaaagg catttagcaa     540
ggtaagtgga gagtgctgat ggagaacaca aaaggagaaa cacagcgact ccagtgcgag     600
ctagcctaga agaggggagg agaagcagaa gacagcaagt gaagagcttg aagaacttga     660
ggcaaacagc actgagatga acagctgtga aaccacaatg gtaggcagta gacactacag     720
tacagtggta tgaacacacg ctttttaaata aa                                  752
```

<210> 15

<211> 677

<212> DNA

<213> Homo sapiens

<400> 15

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gggggagattg accatgagat gttcgccgta aattagagga attaggtctg cacattatta      60
ttcttgacct acttgtggaa gtccgtttta tcaggatatt attgcagttt ggggtgtgaga     120
```

tcacagccag gagccagcga gtctgcaacg ctgcctgcga ttccccaagt gctgaatagg 180
tttgttcaat aaaataacac aaactcggaa ttctttttaca ttgggtatcc caaaacatct 240
ttttaaaaca tgtattaagt tggagcattc attcttaaac taggccacgt aagcattagt 300
ttctcagttt aaaaaataaa gcttccatca attttaacat cataatgatg aaattctgca 360
ggagtattta ttaaagttga actcttccta taaaataatt cagttgttca ttgacaatt 420
aagaccttcc attcaaagta caatactctg tggacttat cattaacatc agtcaaattt 480
tatagttaca aataaaaacc caaggataag actgtttaag taatttgaca aagttcaccc 540
agttgtggct ggggttgaaa ccagacttgc tgaacttcaa agtcaagctt tttttccccc 600
caatgtcaac taaaaaaaag agaacattct ctataccaga gattaggctg gtaaagcttt 660
tctttttata atttga 677

<210> 16

<211> 1157

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 16

gggcacaggg caggggaggg gagggagggg aaaaggccaa ttggtgtaat ttgtggggtc 60
gagataacaa tacttactaa aacagcagca agggctcaat cctggtgaat acattcatga 120
ccccttaatt ttaaagatga ctttgaaggt acacttgtga agaaaagagt taatctaggt 180
caacactctg cagtagaaat ataattaaaa gtcaatacct taatctcttc taaattgaag 240
ggccacgatc tattacatcc ttcactttta tcgggcctgg aaattcaaatt ttaaagaga 300
aaataagaaa tattaggctt ggttgggggtg gcttctacat gaccttagaa aacactttca 360
ttgaagtctg caaagaataa aaagagaaat tctaattggg aattccttat ccagggcagg 420
atgcttaaga aggaagacgc aggtaagagg agtcagagtt caaatttctt tagaaggga 480

aagaaattgt gttaaaccgt ccaggagtaa tgcagacagg ccactgctta gtaaaggaag 540
tgcaatggat agcctagtag caccgaggag cggggactct ggggtcagcc cgggctgggt 600
tgacggcaac ctctgctgct ccctagcacc gagacctaa taagctgacc cccggccaat 660
ctccgcacca cagatccagc atgagaacag cgagagtctg ttcctttcaa tggtagaggag 720
gactccagga gatgacagat aaaacatgtc agaaagtgcc tggcgtatgg cagaagatca 780
gctagtagga ttttcatttc attttcagta gcaaacgcac ttacactgtc tagaacttta 840
actccatcct cacacatcta attctggact tatcaactct gactcttgag tgctgcttac 900
tccacaaggt cactaacttc ctaagacccc gaccctcag agccccaag aggccaggga 960
ggagagtgtc ttcagggtca acagctggac cagcatgtga aacctgcctg nnnnnnnnnn 1020
nnnnnnnnnn nnnnnnnnnn nnnnttcatt ccagcctcag aaatgaaacg gccatgatgg 1080
gcagaggtac attcagagca cttgggtcaca gcaggggaga ggacaccacg caaagtctag 1140
caaagccagg agcccca 1157

<210> 17

<211> 548

<212> DNA

<213> Homo sapiens

<400> 17

gggtacttg gtatcttagg tggattgcct gcttgggtaa acgtacctg gctatcactg 60
tgtgtagaag cttgcgagtt ttattttaaa atggatcggg gagataacga tattcatcct 120
gaacaattag agccatcaag gtattctgtt aaaaatattt aaccttgat gtaatgtata 180
ttttcacagg ttttggaac gttgtggaac ttgcacatcaa taccaagggt gttgggggaa 240
agcttccaaa ttttggtttt gtggtttttg atgactctga accagttcag agaatcttaa 300
ttgcaaaagt aagtgattta aagggcataa ttcaagactt tattatttct gttgtatata 360
ttaatttggg gtattttaaaa accatagaaa atcttttaaat aataaagcta aaaatagtta 420
ttaaatggta tttatgcaaa gaataaagat ttgttagttt gcagatcatt ttaaattttg 480
ttacttgctt tgctgaagaa ggtgggaaag attgcaagat tgcagtgtta gaattttggc 540
tgggtata 548

<210> 18

<211> 647

<212> DNA

<213> Homo sapiens

<400> 18

gggataat	ttt	gggtat	ggtg	ccctct	acac	aggtgc	ccttt	catctt	at	ttt	tccac	attat	60
cgagca	actg	aaaa	agaat	g	tttt	ggc	ttt	aaaa	aa	actt	tttt	gtact	120
agta	atat	acag	ta	ttt	tata	attg	ac	taga	agt	atc	aatgt	tcaaa	180
gaag	ttg	tag	act	ata	aaaa	tatg	ac	tatg	ac	ctt	g	ttg	240
gatt	ttt	tatg	ac	ctt	g	ggcat	g	caat	tct	caaaa	ac	ata	300
caaa	ac	atc	tct	ac	atg	ca	acag	ttg	agg	tta	ac	c	360
ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	420
ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	480
ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	540
ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	600
ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	647

<210> 19

<211> 635

<212> DNA

<213> Homo sapiens

<400> 19

gggctg	agac	ctct	ggc	act	ggc	ag	tag	ac	tt	ata	cag	gc	aa	aga	ag	cca	aa	ca	at	gag	60	
ctcat	ggg	ca	aga	at	gc	cag	ct	gt	ggg	gaa	gt	ct	ggg	cag	ct	ag	ag	ca	aa	ct	gg	120
g	aat	cag	gat	gg	ga	tag	ca	at	ag	tt	gag	ct	ccc	ac	ggg	a	ac	ag	gat	ca	gg	180
ggg	ag	agt	gg	aag	ct	g	tt	gga	ag	ct	tt	ata	aaaa	240								
ttct	gt	tt	ctg	cag	ac	ag	cat	agt	g	ct	ct	ta	gg	ca	aa	ac	ct	tg	gt	ct	300	
gt	aa	ac	cta	gg	gg	gt	ga	ag	g	acc	ag	t	gag	g	ct	cc	ag	tt	ga	gt	360	
gt	at	g	ct	ct	ta	g	gt	at	g	ca	aa	ac	ct	tg	gt	ct	ct	ta	g	at	420	
ta	aa	ag	ag	ca	ac	tt	ta	tt	ca	aa	cc	ag	gc	ct	g	cca	at	g	ca	aa	480	
act	ct	tt	ta	tt	ca	aa	cc	ag	gc	ct	g	cca	at	g	ca	aa	ac	ct	ta	g	540	

agtccagact tatttagacc aaagagcctt tttttcctat cagtgttttc caaattttat 600
cttaagaggc agggctttgt tatgttgccc atgct 635

<210> 20

<211> 736

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..() \

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 20
gggggcacat cctggggacg aaccgggcag ccggagagct gcggccggcc cagtcccgc 60
ccgcctttga agggtaaaac ccaaggcggg gccttggttc tggcagaagg gacgctatga 120
ccgcagaatt cctctccctg ctttgccctg ggctgtgtct gggctacgaa gatgagaaaa 180
agaatgagaa accgcccag cctccctcc acgcctggcc cagctcgggtg gttgaagccg 240
agagcaatgt gaccctgaag tgtcaggctc attcccagaa tgtgacattt gtgctgcgca 300
aggtgaacga cnnnnnnnnn nnnnnngaac agagctcggc agaaaacgaa gctgaattcc 360
ccttcacgga cctgaagcct aaggatgctg ggaggtactt ttgtgcctac aagacaacag 420
cctcccatga gtggtcagaa agcagtgaac acttgacgct ggtggtcaca gataaacacg 480
atgaacttga agctccctca atgaaaacag acaccagaac catctttgtc gccatcttca 540
gctgcatctc catccttctc ctcttcctct cagtcttcat catctacaga tgcagccagc 600
acggtgagct cagagaacgc aaaggagag agggggagtg aaggattttc tcggtaggta 660
aattcctcct gcattttttg taggttcatc atctgaggaa tccaccaaga ggtagatgct 720
tggcatagct catgct 736

<210> 21

<211> 520

<212> DNA

<213> Homo sapiens

<400> 21

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gggcatgggg aaggggggtga ctggagattc tgtggtcttg aaaggcttcc ttgaggagat    60
gaggtgaggg gtgtccttct ggatggattt ctgttctggt ctatggattt gctctgatca    120
aactaagttc agtgataaac aggacagaaa tgtgctcaac agtaggagaa agagaaggaa    180
tgaatggcaa agaaataagt cagacatttc acatagcaag agatcagagg ctacggccag    240
agttaaaaat ccaaagatca caataagtaa tgagagatga gaggctgcct attaaaactg    300
ctgtttctga ctctctgtgg agaaatatca acactttctc tcctcctgcc cctcttcttc    360
ctttctgttt ctctcaggct acactgacat agaatgtata gcagttaatt gaaattatth    420
gatttttgtt ttaaacagag gttgcttgtt aaaataagcc acaagaggga ttttggttaa    480
gttattgatc tcaaacataa atgttttcct tgtagataac                    520

```

<210> 22

<211> 634

<212> DNA

<213> Homo sapiens

<400> 22

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aacattttga aaatacgtgc tatctaaatt tccctcttct ctcaaagatt gaatttaaag    60
ggcattgtta gaaagatcgt aagtacatgg tcatataagc aaaatcctga ttgtatggg    120
tttttttggg cagcaaaaga tacaagcaac aagtaaggga tttcataaat ctggacaggt    180
tatgcataac tcaagacaga aaggaagtgt ccactctacg ttatccaggc agaaaaaat    240
acacgtatca acccagggca gctttcatat tctgctttta agtgtatttg aatctattgg    300
gccgtgaaga taaactggga agacaacaat agcaagttca taataccaag aacgtgcact    360
ttggggtaag ttattaaagt tgactcttct aagaaaatac tgcaagaaaa tcacagtgag    420
gaaggggaac aaattcttag tagtttataa aactcaggta taatattgat ttaatcaaaa    480
ggcaaaactg gagcaaaaga atagtcctgg gcacagtgtc taaagcagac acaccttaaa    540
ccaactttgg aatgccttat gattcatgtc tcaacatgaa cagttctaata cacaaggga    600
ccttctccaa tgccctctga gcagtagtaa aata                    634

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<210> 23

<211> 661

<212> DNA

<213> Homo sapiens

<400> 23

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gggggggggg ggcaaactga taggctaaat atgcagcaaa gtcacttgcc aaaggaaaat      60
gctctgaaga gcttgtaatg ccttagagat ttaaaagatt taagttgtag ggtaaaataa      120
taaatttgta tgggtaaact aatgaaaagt tttaacaatc tactgtaaaa agtttatttg      180
caactctaac ttcttagaat gttaataaca attagcacat taatatacca cacagggtaca      240
ccaaaactta tgtttaaaaa gtttatttta aaaatctaa; tatagtatca acacatagct      300
catgataaat ttggaaaaca tagaaaaata ggataaagaa cataaaaaatc accaattgca      360
gcacccaaat ataaccactg ttagcatttt gtgtgaaact tccttattct tttgctttct      420
atgcacatgt ataaatataa atgattaaac aaacctcaaa gttttccaca taaagagttc      480
tgtatcctgt tttctaaatc tgatattata taatgtacaa tttcctatgg cactagacat      540
ccttcaaaat catgatttta atgcctgtgt tatagtctac ctcagagaca tcttatttat      600
tctgaacatt cttgctcaaa aatcactgac attttttcta attatttttc ttggaacaa      660
t                                                                                   661

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<210> 24

<211> 529

<212> DNA

<213> Homo sapiens

<400> 24

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gcggccgcgg gaaactgaga gccattttac tataggagat gcaagccaag caaaagcaga      60
tttcctgagc aaggatgtct caaggacat ctcataacac atcacaggat tagcagagtt      120
ctcaaaacag taatagatgc atttctatca cctgaaacag ctgacagaaa aaaaaacatg      180
gaggaaacat gttgcaaatt ttctttatac tctgtcaagg gttttcctcg ggacacagct      240
tcatgagagt tctatgctca cctatttaac cacctctggg aacaaaagga caggaatgag      300
tacatgcaac acaaactact ccattccac caaggcgtct acacttactt gctcatctcc      360
caaccaccca tctgggtgag gaagggcaca gtggatgtga caatgaggat gaaaacacgt      420

```


ggtaggatgg tggaggcggc cagaagaggc agcattggtc tggctcttcc tgattgagaa . 480
catcaatcca aggcacagg cacctctcct ttgctcttct ctcttctc 529

<210> 25

<211> 632

<212> DNA

<213> Homo sapiens

<400> 25

gggtgaggtc tcctgatgga gcagtagatt ccaatactag taacctataa tgagaagaca . 60
aggaaggtgg cccctagtta tttcttgacc atgtccttgg ccagaaagac tggccaacag 120
aagccagagg agtgggtaga tgttcaggcc tctactcaag ttcagcaagg gctggtacag 180
ctatactctg ctgtgtgggt gcaaaatacc tagatTTTTT ggactactaa ttgtttgcta 240
ataataactg ttcacacccc aaaccttggt agttgttcat caccctaaacc taagagattt 300
tctttcttta gcaccattca gaaaattaca atattcaaatt aaattaagat acgcaaacac 360
cgaagaactt ttaaacacag gtcttgatgt ttacctacaa attttgaatt ctatgactca 420
aaaaataaat caacagaaac tgatagtga atggatattt aagactgaga tcacagtcag 480
gaagcagtga gtacttaaga tgaataagct taacctattt aaacataaaa caagaaggga 540
agtaagacaa aaattacctc ttttccatcc attcatactt tctgaacaat tagtttctta 600
tgactccagg aatttgacat tagactatgt tc 632

<210> 26

<211> 568

<212> DNA

<213> Homo sapiens

<400> 26

cagcagatc atcaaactcc acaaaacat atctttgtcc taaaactgtg ccacatgctt 60
ttctttgtat gtggacatga cagtcctcag ccaaccatca gcaggatgtg agttttgttt 120
tcacaatgtg gtgagccatt cccacattca ctcatTTTcc ttgtaagaac cgaacctctc 180
catggctggc caggattagg gatgttgccg tgctcactga gtggcagagc tggggtgcga 240
cttcagggct caccattacc cagtctggga ctctttttcac gtcggcaaac tggcagttcc 300
cgcacaccaa gggctctctg attagagcta gtgtggattc ctggctctgca aacgttggcc 360

```

acagctcagt ctgcacttga tctttcccca ccttggggca gggatgaagca cctctaagct    420
gggggtatgt gacaaccagg ttactttcac tcgtcttttg gttcccatta gccagtgta    480
gccatctggg ccttccgaaa acatgtgtgg gttcagaaca taacagactc ttaaacaaca    540
caatgagcag gctgccaggt gttaaagc                                     568

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<210> 27

<211> 695

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 27

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ggggaattca aggaagggtg ccatcttgat atcatgaaat ccactttcag gctaattccc    60
atataatata gaatttcaaa tatctacaaa cacaaggaca gaaaatagga accatgatata    120
ttgggtcccct ttaggattga gacatcctac ttctaactta atactcctgg ggtcccccg    180
gcttcatnnn nnnnnnnnnn nnnaaaatac agctgaatat actgaaatta gttagtgatg    240
tcaattacac tgaaagtgtt gattgacact ttcagttgtt gaaaacactt tcagtgtagt    300
tgatatcact aattgagact gagagggtga ggagcccttc agagccagcc attccacact    360
taagtcattt ttagatatca tatgtagttc ttattacaac cccaaaatag gaattattag    420
attcttcaaa tccagtcttt atacgatttc ctgagaaacc actccaaaaa cattaccca    480
aaacacataa agagtacttt atctttcaaa atattctatt tgcaacctca cagttccttc    540
ctaatagttg tccactataa ttaagccaaa gaaaaaagct catgttcact ggcttatcta    600
atgtcttaag agatacaata aatttaaagg attagatata attagagaaa atttgatata    660
acaataaaga ttccatgccc attttcagag aatat                                     695

```

<210> 28

<211> 761

<212> DNA

<213> Homo sapiens

<400> 28

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gggacgtttg acgtggtgtg gccactttac gttttcaagt ctatgagaat gtctgcgcgg      60
agacagcata gctctgtaga aatgagtggc agcgtatgta acctggcatt ttgaaccag      120
gagcacaatt ttattaaagg aaaataaacc tacttttctca ttgataacac tgtttttttag      180
ttttatggtg aactgttcgg aagtaatfff caacaagtgc ttatfffata aatattagac      240
cgtgtacccc taggattgtg ttttttttga gaaaactggc ccatagaagc ggtgcaaaag      300
ttttaaaactc atctgcctcg gatcctcctc ctctgagcag atgctcaatt aaactffttc      360
tagtatctta ataattggag gtattaatag atgtffttatt ttgagatac atattgtaca      420
tttttagatct tttttttttt ctaaagtagg gatccaaaat tgaggtgaaa tatatttgct      480
tacatggcaa gactfftttaa aagtagaatt tctgtaattg aagaccatcc ttttttgtgt      540
gtgaatagaa tggttgcggc ttctcttggg atcattgatt agtgaattac gatttgggta      600
agatagaatg cgtfftttagg aagttggagg ttgactaat cgctgtgtta gcatatgagt      660
aacaattttg aagaagatac aagcattfff atggctgacg tttctaatca gataatttta      720
tttttaagct tgctctgttt tacttttggt aagtgaacat t                                761
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<210> 29

<211> 557

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 29
gggggagaaa aaaaagccat tacactcagc taactcctaa agtgtagtta ttgagcttac 60
atagaaaatc cttgtagcca catagtcttc aactgatgac aggatgaaaa gaccttcttt 120
tgcctaccaa actgccaaat ccaaggcctt tgcaggaaag aagtgctgat aatacaagta 180
ttactcttgg agaaaaggaa tactcagttt caatctcata tttgaacaag gtatatccca 240
aataatcagg agtatttagc aaaatgcaat catgttaaaa tgtatttcac ttacctgttt 300
cctcaaaaac atttgттаат tcctttgagt gcaccnnnnn nnnnnnnnnn nnnnnnnnnn 360
nnnnnnnnnn nnncaagtaa aactgaaatt aattttattt cctttttttc ttttaagtaaa 420
gaaactatgt tatctcccaa aaagctctta gaggaattct actaaacatt tatggcaaaa 480
atattgctac tattttaaaa tgttccagag cccactggaa gagagaaagc tgctaactgc 540
cttttataat cagtctc 557

<210> 30

<211> 581

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 30
gggagacagg cgggcttctt ggtagatat gacaggaaca gcctcttaga aaagtgatgt 60
aaagtaaata taaaggccct agccctccag gcaagacgga atagactctt tgtggcaata 120
agatagcaaa ttatgnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 180
nnnnnnncct cgttccatgt ccttctatgt taaaccatcc cccaaatggg gtgaagtccc 240
cagaatggct ggccccgcca tttctctatt ttgttttctc taacctctg ccctctctct 300
tccacctcca gtatatggca cggcacattg gaggtgctca aaaatgattt aataaatgaa 360

tggagaaagc acataggcag gacatcctag taccaatgat gaatgagtgt ttatggcaga 420
 tgtgaccag gtcctcagag gcacatgaaa aatgctaata aacggcagca ctcattattc 480
 actgtatgaa cgtggcttca agcagtagag atgttaaagc atcctgtaat ggagtataac 540
 tgggtctctct ctctctcctt tttttttttt aatgacgccg a 581

<210> 31

<211> 648

<212> DNA

<213> Homo sapiens

<400> 31

gggaggggaat gtacaaggga ttgggttatat ttttagttgt gaagttgaag caggctaagg 60
 aggggagggg gcacaccaag acggtgaggg accaggaaag aaatttgaat tggagatccc 120
 aggacaatca gcaaattggt ggaattgact attaaacgga tcgagctgca aagatggcat 180
 agatattata aaatacaaaa gcccttggag acctaaaagt gagggaaaga ttgaattttg 240
 cttttatttt tgctgacaat actttgatta ctttatgcaa acaaaagcct tttaaatttac 300
 ttacaaaatc cattgcgttc tttgatggcg ggggaattcgg ctgtcaaaaa gactccagat 360
 cttaagttta aaaaattatt ctcttttaac cacaattctt tagttttatg ctagatcttc 420
 ttggactaga ggtgcatttt taatagtcta ataaggatct atatcactgg catgtagatt 480
 tttgttctgg catgttattt ttctgaggct atgttttcat ttatctggtt agtaggggaa 540
 tcagttttct taagtctaac cataattaaa agagtatcac acaggattac tttgcttaac 600
 tgggtcaaat ttgttcctca taaaataaga aagaaggaag aaattgtc 648

<210> 32

<211> 434

<212> DNA

<213> Homo sapiens

<400> 32

ggggcctggc aggacatgat ggctactgca tggtcacagg agtttctgaa gagagtctta 60
 actttttgca aagttgtgag caagggacag tgacgtgccc agggcatggc accagagggg 120
 actgggctgc aagacagctg tggcagcctc aggaagagga tcacagccgc caggagactg 180
 cccctggccg ggcagggctc aggagccacg gtgcacatag ctctgtgccg cagcgggccg 240

cgcagggcag gaaaggagcg tgtgtgggaa caggtgcacg tgtgggatat ccagggcggc 300
 acagagtgag cttggtcagg tcgcactgtg ctgcccgate aactgcatat aacataattc 360
 tcttcttttg gatattgaat attaagattt ttaatagaat ttttggctaa gtaacataag 420
 taatacagca gcaa 434

<210> 33

<211> 594

<212> DNA

<213> Homo sapiens

<400> 33

ggggtgcagg gatgtaagtt ggggggtggtg tagaatgaag aagacggaga gaaggaagga 60
 tctagagtgc aacagaaaag aaacaatttt ttccctctcca tgcctggctg ctacctgaca 120
 aacaatcaag aatcatagag ccgggatcct tctgtttgtc cctctaattgt atgggaaggt 180
 ggggtgaagca tcagggttat gaatgctatc atgagacttc acacagtata tttttgtgtc 240
 ccaaagcaga gccagacca caaggcccac actgactgcc tctctgtggc aaacgtcaca 300
 tatgtccatc acccaccta ttattgtctc ctcccttcca gaggtgaact tcctccatga 360
 atttcccttc ctgaaactca tgatgggaac attaggctgt tgcaatacaa attggcacag 420
 ctcaagacat tcagttttaga atgggttttc aggtgagact tcttccctat atgagagtca 480
 cgaggctctc aaatgctgct ataaactagc aaggctggat ttgatcgtgc aattaagggt 540
 ctagcactgc ataactatcc aggctaaaga gctcatttaa aaaggggaac ttag 594

<210> 34

<211> 514

<212> DNA

<213> Homo sapiens

<400> 34

ggggtggatgt tcgaggggtga atatgacaca agtccccagg gatTTTTTggg tgcaaggggg 60
 ccagggtgtt gggccagctg acagtgggag agtggtcagg gtgaaaactg cagggaacag 120
 caggaagcgg caagcagaaa gggctggctg gcgttacgga aggaactgct gatcaagaac 180
 gctgattgta ttcgtgtggg cagtgttaga aggaaagcat tggcctggct tttggaaagg 240

gtaagaagtt ggggtctcggg gagttttatg aaacacagag ttgaaatcgt gatcccagcc 300
 attaggtgga aggggttggg gctgagaaag aaggcatagg cctggtggtg gtttgggggg 360
 aagtccagtg agtaagagac cctggacttt cttttcctca ctcttttccc tccaggtgtc 420
 tctctgttgt atgctttctc ctttccgaac gtttctccct ttattttctt ttcgttctgt 480
 ccttttagttg gtcataatat ggcattggtg tata 514

<210> 35

<211> 502

<212> DNA

<213> Homo sapiens

<400> 35

aaaaaaaaaa aaagaattct ttcattcctta gtgatgagat attaaccacc ccataacatt 60
 ctatttttct tagtcggcat gcagaaagca tttgagaatc aggagtagca atttctgccc 120
 attgcatgag ggggctgcga taagtaaagg gttgtgagtg tgttacaaga ggtctcctga 180
 gacttagcac tgaagaaaac accagccaac ctaaactttt cctgaagctg atatcaggtg 240
 aatattctct tgtgacagag gaccaggcca aaaaaaggcc aagatcataa gttttatttc 300
 attttgggcc agtgatctca ttgctgttct aaggatgcag agggcattcc aaactcaacc 360
 agccaactca taaacgcatg ctctttatca caggagtatg gaaggtcctg ggtcccacca 420
 ttggtgaaaa ggacaaatag tacagccatc tgggtctaca aaaggagagt tatcctgctc 480
 ccaattctct aaaccaatta aa 502

<210> 36

<211> 419

<212> DNA

<213> Homo sapiens

<400> 36

ggggatcagg tgggtggaact tttctttcct caggatatca tagtcattgc tgtctggccc 60
 ttggccaaaa tcccctaaga taatgacatc cttttctcct ttcagggttt cctgggaggc 120
 ctgtgctgag gctggccacc tggaaacttc agggctgttc cgtggagaag gccaacaacc 180
 ccggggtgog agaggtggtg tgcattgacac tcctggaaaa cagcatcaag cttctagctg 240
 tgcaagaact gcttgacaga gaggccttgg aaaaggtggg aagtcacgac ctgacccttg 300

ttaaccttca cctggcagcc ctgaccctcc tggggagcga ggaatcccag caagaatcac 360
agtgatggcc accggttggc gagctttgca caagacccta caggaaacct tgaaaggag 419

<210> 37

<211> 698

<212> DNA

<213> Homo sapiens

<400> 37

gggtcagtag tgcattctca tgtacagaag atggcttgtg ttcccgtga gtcttcgtgt 60
aaattaatcc tgtgtatatt gagcattctc caatattatc tcaaaaattc tatccattgg 120
aattctttca actttttggg tgctagcaga aagaggagat aaagaagcag aaagtcttgg 180
ctgggggttg agttgcgggg gtttctgtcc agaggcagtg ggacccggca gggcacgcac 240
agccctgctg tgagatttct caagcattcc catcagcatt cccaagtccg ctctctccc 300
tttttaaaac agaaacaaca cacgcttctt gccggcctta taaaggacag caaaaactag 360
tttgcttga aaatgtcttc tagaaaatta tctaaattta gaaaatcatc taagtctcgc 420
tagccttttc ccttttctag ccatttagga tagtcattgt gaccaagtaa attcagttta 480
ttggaaaaag aaaaaaaact gccacttca gagatgatca tgctacctcc tccacagagc 540
tccaccagat attttggcaa acccatgtaa cacagaaaga gacagcaaaa acagggcaga 600
gaggagacgt aaaaggccat cagtatcttt atacttcatt tcaaaaatga aaaagtaaga 660
atgttaatgc tctcagaca gcactttttt ttttttaa 698

<210> 38

<211> 431

<212> DNA

<213> Homo sapiens

<400> 38

ggggagggtc cgggatgtcc ccagagcagg tactgcagcc cctggagggc gacctctgct 60
atgcagacct gacctgcag ctggccggaa cctccccgcg aaaggctacc acgaagcttt 120
cctctgcca ggttgaccag gtggaagtgg aatatgtcac catggcttcc ttgccgaaag 180
aggacatttc ctatgcatt ctgaccttgg gtgctgagga tcaggaaccg acctactgca 240

acatggggcca cctcaatagc cacctccccg gcagggggccc tgaggagccc acggaataca 300
gcaccatcag caggccttag cctgcactcc aggctccttc ttggacccca agctgtgagc 360
acactcctgc ctcatcgacc gtctgcccc tgctcccctt atcaggacca acccggggac 420
tggtgcctct g 431

<210> 39

<211> 539

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 39

gtaactcaaa aaggactcta cttccacagg gctgaatcgg aactcgctcc ctctgcctct 60
cccactctgt gttaccatct gagactctgc ccttcacggc ccaatttcaa cacaagtggc 120
ttgattctgt gtggctcaag gattgactcc agtgccgtca accttttggc cacgaagtcg 180
ttagtcatgt cttcagatgc atctggtgag tctcccttcc accctgtgga agtagagtcc 240
ttcctgggtc tcatccttcc agtagctccc gtgcctccag ggtctttgca gtcacataga 300
gggtttgagc annnnnnnnn nnnnnnctag gctgcccggg ccttagggaa cgaagaccaa 360
actcggcagt gtggaccaga gcacacgcca ggcgaccaca cgcttcccac cccgccgccg 420
ttcccactcc cttcatgctt ccttgagtc tcacgtcaca cctttgctct ggaacattct 480
tcttcctaca aagcctggcc atggggcgcc tcgccatgaa gccaggccct tgttcttcc 539

<210> 40

<211> 659

<212> DNA

<213> Homo sapiens

<400> 40

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gcgggaaatg gccccagatt ctagttccct aactacattg caagctctcc tggggtcaca    60
gactgttcct tctattccac actcttaaag aatgcatcta gttctgtggc ttgcaaactt    120
ttactttcat ttatgtatgt ttatttgtaa gttttatata aataagcaaa actaaatttt    180
agagacactg gctaacgtta gtttgatata cattagttta ttataaaaga gagacatgga    240
aattatttac acaatgaaag atttcagaac tccagtggaa tcagtgtctt cacatgagge    300
tttttcaata gtgatttatt tcggtatata tactttccaa gaatgccacc atttctaaat    360
aagaaattat ccctgtcgtc cagaactact ttgggtgcctc catattctag attctggggg    420
aagaatttta tctccagctt ttgggctaac tggttgaatc tctccacctt ttcctttaga    480
gcccaataca acagcttcta cagttgcttg caatactttt gagatttttc tggagacata    540
atgcctcctt tggttacagt ctcagctgca ttcctttcaa ctaataccca gtcaaagagg    600
cgaaaaaaac tttctaaatg actcgggcca ccacagctta tactctccct ttcaaactg    659

```

<210> 41

<211> 647

<212> DNA

<213> Homo sapiens

<400> 41

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tgaaaggctt tcttaggtac aaagaactca agaaacactt tggaaccaaa ccaatttctc    60
tgagaaccct ttcaaaaaga gctagagctc catctataat cagcaaagta tctgtcaacg    120
aaagccaagg atcaatgtac agtgactacc agaacagggtt agaagggcac actcataaac    180
ctttgctact ggtttggggg tttcagtttt aacttttctg ttaaaattct cagcatttat    240
ctcaaatgaa agtattatgt aaaatgaaat aatgaaggag gtttattaga tgggaagggg    300
taactgatta agacaaagta taaggatctt ttcaaaatcc atctctaaac atcaataaac    360
tgccctcagaa aatctctcac taggaattat acacacaccc atttgatata atatggataa    420
gtcttcacca ccagtctaaa tccctcttcc cacctcccat ccaacatacg ttaacatgga    480
gatggttaag caagctgccc atagctcttc tttgaatttt ccctatagcc ccattaccct    540
ttttttaaac agaaaaactg atttagatag aaagaacaag ttttgttttt gcaaagctta    600
tgatagactt acaaattcaa tgacaaaaat cagtaatat taaaatg                    647

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<210> 42

<211> 715

<212> DNA

<213> Homo sapiens

<400> 42

gggacttggg gtctgctaag gtaaataagca ctgcattaat ggtcttatcg atttaagggg	60
atctccctct ttcctcaacc tgggtccagcg agaggagtc cccagtggag ggcatgtctc	120
actgctcaag agaggtttgt atccttgctg ctcagcaact ggggctagga taccctgaaa	180
attctggaaa tcaccaagcc acatcagtgg catgactgga agctcatgac tgtctgatgc	240
tgtagaggaa gttccctga tgtcccagac ccagggacg gatgcagagc aggggaggga	300
accccttccc ctggttgac accatcttcc agaccctgg gattcagggg acaaatgcag	360
atcaaaaagt agggcaaaaa cagttctgtg cctccctttt aaggttcaac tcgggactga	420
aaaatcttgc gtttccttac accagccgca ctcaattgcg tgtgaagatg ctctcctct	480
cttcgttctt gttgatttcc tgacttaact tactgagaat cctgcaagat aaagagacag	540
atgaagagat aaaaccatca ctcagtctca accttcccc tgacccttga tatccctgg	600
tctatagaaa cttggggcac cagggccaac tttggccagg ctctcttttg tcacctctgc	660
agggaccctc tgctcttcac ttcctcccag aacttgccat cttattcccc gggcc	715

<210> 43

<211> 619

<212> DNA

<213> Homo sapiens

<400> 43

ggggaagaaa aaaagatgag ttgttcatgg ctagtgtcct tcagaaatgc ccagtgtgga	60
ggagaacaga ccagaacctg gtgggcattg ggccagagag acatgaagat acataggagc	120
tctgagggac ccccagccca cccagcccta gagcagggag aacaggggtg gttaaggcac	180
aagttgtgtc ttaggctgtg ttcaagaaca actagaattg tttgggtaaa gtaggaggaa	240
gatgttcttg tttacaagag gggacagctt gtgaagacca ggaggtgggg ttgatcatgg	300
ccaactctga gaacctcaag aagttcagtc ctactgggca gtccagtgga agaggggagt	360
ggcataagag agctgtagag agggcaggga ccagtccttt cagggtctcg atgctaggct	420

gggaagcttg gtttatcctg agggcaatgg gaaccatggt aggatttaag caggggtggga 480
 cctggggaga ggcccagagg tgtgttttag aaagctgact tatgctggct gatgtgcaga 540
 ggcagtgggt cggtagaggag gctgggccag tagtccagge aggtggccag ggcagtgggg 600
 atggaggagg agtgatata 619

<210> 44

<211> 760

<212> DNA

<213> Homo sapiens

<400> 44

gggatacatc ataatacttt ttattagcat agcctttgtc aatctagcct cctcaagggt 60
 ctttaggacc tggcttctgc agttgaaaag aacagtgtct tcctcccaag gggcagctgt 120
 ctttttcatt gaacttggtg ctagaggagc ttctagtttt aaagcacata ctctttagcg 180
 tatgtgttaa tttcattaac caccagtaag ttcttcttat gcatgggcca aaataatgat 240
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 ttacctgcag gctctcaaag atattttttc tccttaagtt tgagcatatt tcatgtaaatt 360
 aaaagggatc ccaaagagca tcttgtgcga acccttgggt caagacaacc caacctaaaa 420
 ttcattctaga tcacctggac ttttatgttg aaaggatttt tccccagaa taggacattt 480
 gtttcccatc tattctggct tacaatactg aagagtcca gtccatattt atgaaggaag 540
 cagccttaaa gtgttaccat gaacacttta taaacaggca ttgtgggcct ttgaaaagaa 600
 agctgctgat gtctgagttt tatgggagtc ctagccaggt gtttaagtgt tcttcttaac 660
 acttaagtat attttgtaac agaagaaaaa tgaaaattag tatatctgcg cttcataatt 720
 atcatattaa agagttgagt cgatttttagc aactaaacta 760

<210> 45

<211> 675

<212> DNA

<213> Homo sapiens

<400> 45

ggggtaggag aagggggagg agggatgctt aaaaaaaaaa aaacctgctg gagtgacaga 60
 taacttgaga gaacttcctt acaggggaaa aaacttctaa agaattgatgg ccaaattact 120

ttggctgtgt tcagggttaga cactttttga tgcctatcac ttcataattt tagcagcaat	180
caaaccaaac acttcattaa atataaaatg ttctcaaaag gcagtttagtg gttttaattt	240
ccaaacacac ttatttagaa atccccctctc agggctgtca atgaaatgct gagggaaaaa	300
cacatcacac acagggactt tgtgagtctc agaagccata acacacctca tggaacaaat	360
gacaaatata tgattggtac tgcaggttcc agttaagagg aagcactgaa gacgaactag	420
tcaggaaata tgcattgttta gaatttcaag atgttacact gccaaataaa ggaaatcaac	480
tgaccttcac tattcttcct agtctctgaa gatggaacta ctcagggtctg gtttcagata	540
tgggctaaaa caaagagatc cagttgccaa gtttgaaata tctgagggtc cagcctcgaa	600
aaacttcatg ttaaattgaga caaagatatg taaagcactt ggtatttcac ccaccacgca	660
atacatgttt aatga	675

<210> 46

<211> 540

<212> DNA

<213> Homo sapiens

<400> 46

ggggtgctcg gagaaggcag acatgggaaa accctactaa aatcctgagc tctcgtgct	60
gtgccgcctt cccaaccat ttccctgcc caagggcaag tccaagaga gagcagagga	120
gagtttgga gagaagctgc cccaggaga gaaggaaggt gcaagtgtac aagtaaacac	180
ggtagcaata acccactgaa tgccgctctg ctgggctcaa ggctgaacga catctggaca	240
ctgctggaca tctgcagctc tgggtcaaca acacactgca tcccagccag agggccctcc	300
tgcatagaca gtgcctaacc ctggggcttc tcagctaagg gagagggaag cgggcctcac	360
tccaaacaag ggtcaccctc tgccggcctc acatctaaag ggaccaccac agtcaagctg	420
aggaacttcc tcagcaggcc cctcaccacc cccaccagcc cagggtcaacc gccaggagac	480
tgctgagggc tagacagcta cccagggaga gacagaagcc acaggatgcc atgggggggt	540

<210> 47

<211> 405

<212> DNA

<213> Homo sapiens

<400> 47
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catcggacta ggggggtctaa cagtatatag cctggggggag gtgagtgaga ccagcgatat 180
atagagagga gaatcaggga aatacgggaa tgggggttgag ccttccctcc ctgttcccat 240
taacagcagc ctcttgctga tccataccaa cccagcgta tctccagccc ctgcaaaacc 300
aggtcagtgt tgtctgctac acagcctact ctctgtcttt gggtgatttg tctctctttg 360
cagccccaaa gtgggtttta aggctaccac aggaaactgg acttc 405

<210> 48

<211> 527

<212> DNA

<213> Homo sapiens

<400> 48
ggggcacctt ggcgaggtgg cgctgccgga ggctgagggc tatctacacc atcatgcgct 60
ggttccggag acacaagggtg cgggctcacc tggctgagct gcagcggcga ttccaggctg 120
caaggcagcc gccactctac gggcgtgacc ttgtgtggcc gctgccccct gctgtgctgc 180
agcccttcca ggacacctgc cagcactct tctgcagggtg gcgggcccgg cagctgggtga 240
agaacatccc cccttcagac atgccccaga tcaaggccaa ggtggccgcc atgggggccc 300
tgcaagggtt tcgtcaggac tggggctgcc gacgggcctg ggcccagagac tacctgtcct 360
ctgccactga caatcccaca gcatcaagcc tgtttgctca gcgactaaag acacttcggg 420
aaaagatgg cttcgggggt gtgctctttt caagccatgt ccgcaagggtg aaccgccaat 480
tgtccgcccc gccagcgctg caaataaacc ttctgagtca gccctct 527

<210> 49

<211> 533

<212> DNA

<213> Homo sapiens

<400> 49
gggtggctgg tttctgaggg acgtctgaat atttccacca taaatccatt tctaggtctg 60

ataaggcagc caccaaaaca aaaaacaaaa agcacctgca ctcccctctt gctgttgatg 120
 caagcctgct gctagctctc cacatcacccg gtgaggggaat cctagcttca ggcctctaac 180
 cctgactagt gactcatctg ggagtaaagg ggtcacatat ttctatctgt gtgcctacaa 240
 actagagatc agcaagggtct gcaaagtttt agccccagga agaataaaaa ccggaagcag 300
 tcatgttctt tctctcctct ctgccaaagct cctgaaggag agaggggtgcc ttctgctcac 360
 ctcaactttt cttacctatc acattacttt gtgctccatt ttctacggct aggcatttgc 420
 taaagtatga gcaaatgaac attttattag tattttattt gtatttttgg agaagatata 480
 gagtttcatg agaaacactg atttttctca aacaatagaa aaagtgtttt ttg 533

<210> 50

<211> 439

<212> DNA

<213> Homo sapiens

<400> 50

gggccacaat ggcagctttg gggaccacaa ttcgggaaca tgtattctca aagtcagcat 60
 ggatgtcaat acccctgatt taatggcacc tgtgtctgct aaaaaagaaa agaaagtttc 120
 ctgcatgttc attcctgatg ggcgggtgtc tgtctctgct cgaattgaca gaaaaggatt 180
 ctgtgaagggt aaaatcctaa cgcttatggc agttaaaaca ggaactggat tcacggggcga 240
 tggacattat actgagattc attacagtta acttacctat actaatttat gctattgatg 300
 taataatatc gtgcagtagt ttcacttcat cgtgatgaat aaatgcccat ctatctctct 360
 ttgtagactt gcctaacgat atctcacctc tactcccatg aattcacctt tgattccatt 420
 gtgaactgtc aatcataag 439

<210> 51

<211> 666

<212> DNA

<213> Homo sapiens

<400> 51

gggggcggcg gcaccaagc ctgcagttag gcagttagg acaggagcac gggaggagct 60
 gcctgtagtg cccatttcta ttctggaatg aacagagaaa ccctctgcc aaataagctt 120
 tgaatataag tgaactggct tgtattagaa tttactggtt aactggcttg tattagaatt 180

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tacacaaagt ggctttgaaa atcgagccgt ctcttagtag tggtatccca aggcattcaa      240
tagttctgag gtttttcac c tatgagtgat tatcccaatg tgctaaagaa aaagagaaag      300
agaatatatc agatttgaac aaagcaaatc tgttacgaaa ttttaaattc tgttcactaa      360
gtcaaaaatc tgcttctcgc taatacatat tcataaacat ttgcttattt tgcataaaac      420
agaatctaaa gtagcaaaaa catcacagag aaagactggg acacacaggg atcacagaaa      480
acacagtcct caatcacaca ggaacacagg aacacagatt cggttttaaa tcttatcttt      540
caacttaaaa aaaagactca aatctctctt aagttctaat tataaaacaa atttctatat      600
ttatattatc tgtatgaact agaaataatc attgtacgat tattcacggt tctattatat      660
ttgagt                                           666

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<210> 52

<211> 592

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 52

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ggggcggtag cggtggtggc tgcttcacga gcagggcctg ggccagctgg cgctggtgct      60
gctggatctg ctgctgcaga ttagtgattg tgcgcgcaac ctggcaggca gagacatagg      120
tgcgttaact aggtgggaag ggacactcat ggcttgtcta gggaccaa at gcattcttca      180
ttgtctttat gctgaggcca ctactggcta ggccaacctc ctcccaaacc tagctgaacc      240
caggaatttt caaaggaagg cttggctaga gaaaaatcaa tgatcatcta atagttcatc      300
aattagcgtc tcttctatca gggaaaatta tagctcatga caaaaatcaa tctgggtagc      360
acctacttgc tgctcctggt gtctcatgga tccggacnnn nnnnnnnnnn nnnntaacat      420
ctgctgctgg atttgtaa ac gttggtatgc ctgttgacag aacgaagagt taaaatagta      480

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tgataattaa gtgtaagttg aactaatggt tcaactttct gacattagtt aaaaaataaa 540
 aaaagagaac ctagccactc ttcttggtcc atactgtggc tgacacatac tg 592

<210> 53

<211> 498

<212> DNA

<213> Homo sapiens

<400> 53

gggggtgaag agtgaaattg gactgttaga ctccatgata gtcaaaggac ataacatcct 60
 attttactgt ccttcagaag agctaaaatg ttctcagaga gtgacaaaaa gatgatagtt 120
 acttccttga cagcaacata gggagaaact ttatgaaaag ctagaaaatt tatatgcatc 180
 tgacttcagt gactatccaa aataaatttc aaagtataca attttttttt tacaagacag 240
 ctcaagtagc accaccattt ccctttaaaa aaaaataaaa taagcctttt ccctgattgt 300
 aaggattatg cacaatattc tagataaaaa ttttggaag cataagagac gaaaattacc 360
 tatagtctca caagttaata ttgtggttta catttcagtg catatacttc tggtcttttt 420
 ttctctttgt agactttcta cgaaatttca tttttttccc agaagtcagg ctgctagatc 480
 tgtgtgatct ttaccgaa 498

<210> 54

<211> 464

<212> DNA

<213> Homo sapiens

<400> 54

gggaacagtg tgtaggaagt tggaacagaa tgtgaaaagg acacagagga accaaaaagc 60
 acccettaca ggtggggccc agagtgaacag gagatacagc aggcagggcc agatcaggca 120
 gagccttggtg gttcccatgc agggacctgt ctggattctt agagcaaccg gcagcccctg 180
 gagggtttta agcaggcaag ggcatactca gggctgagcg tttgaataac ctctctggct 240
 acaatgcttt tattggccac aatatttttg aagactgaag ttaacacatg gtctgagcag 300
 ctactcttg cccccctgaa gaattctagg aactgtgtga ggctgcagtg gtcagagggg 360
 ctgctgagcc atgagaagaa aaggacact ggagctgcgc agcaaaaggg ctctgaggtc 420
 gccagagtgg ctgccagata aggaacagtg ggaggagcg gctg 464

<210> 55

<211> 682

<212> DNA

<213> Homo sapiens

<400> 55

gggggggactg ggtgttttgg ctcaaataat acaaaagcgg cttgtgatca agtgtgccag 60
tcttcgtttt gcttcccact ggagtggtcca caactgctga ggacaactca ggcccatgag 120
gtttgctcaa atggagactt ttaacagtgg aaaacgcaga cactgtctgg actggaagtg 180
taattcagac tgtatttcaa gacgtcacat cttcagggat caagaaaaaa caatcactcc 240
ttatttgaac acaattaggt aggtgtgttc tatcatcctg gccacatttt tataaacaaa 300
tatactgcaa atttgaaaac agtgaggacg tcaggagtta aagtgctata atatgtaact 360
aaactagaag gaactaaatt acaaatttac tcctgggagg cattttatct cctctcaagt 420
ttcaagcaat aaacatctat catttaacaa accagctggc catatctgcc ctcctttacc 480
aagtctttta ccttgctcaa cacgaacagc taaggacaaa aggcagagat cctttatcca 540
ggttaaatcc actctgggaa agtggttaaaa ctttccaccg gtaattttac ctttaaatca 600
tcatgttgta gatacttttt tctgtaaggt gtttttatat tcaatacctt cacagtatga 660
atgagattct aagatcagta at 682

<210> 56

<211> 633

<212> DNA

<213> Homo sapiens

<400> 56

gggttgccaa atgacagact ctccagtcac gaaaaggaat ataaagcaat ctactacaa 60
aaaaaaaaat tcttgtaaaa atcctccctt cttcagatgt tgtaattaat tatgccaaaa 120
caaacctctg gatttctatc caagcctaaa tcccagttta ttttatttct tagaaatgat 180
aaatactttt tgacaatttg ttttgctaca tccaagtctt ttagtggctg gctttgttat 240
caaattcacc attttaaatg attttaacaa gggttgccaa gaacatacgg ggaaaaaaa 300
ctttccata tatccttggc agaaactggc attccccctt tctcagttcc cttctgagag 360

tgccctgctgt cgctggagca gctatagcag tgtgtttacc cagttgatag tgcacacatc 420
cttctcactg caggacacca ggcaccttc cttggcctct ggcaccttct gccaggttac 480
tgcccagcct cctctattac ccacgcccct catTTTTctgt gcaacccccca actgggcctc 540
cttttcactc atcagctaag ctacttttaa acatttgggt ctcaggcccc taacaaaagc 600
aaatttgccc atctgattta tttcaaaagg gag 633

<210> 57

<211> 734

<212> DNA

<213> Homo sapiens

<400> 57

ggggaaaaaa gatttagaat tgaaaagaac ttggattggg aaaattaaaa ctaaaatcaa 60
cagtttctag tttctaagag accaaaagtt actatgaagt aaagctaggc ttttcatttt 120
catgaaataa tttacaatga caacagaaac aaaacataag tgaacacaat taaggctgtt 180
tgtacctcaa atgtggagtt ttttagtgga taccaagttt tggtaagcac aagggggtaa 240
cattctaatt caattattat ttttttaa at cagtaa atag ctgccctcaa ctggataata 300
cagggcattg caactgtggc aaaccaaag ctgtaacaga atcctgtgtt tgtcataata 360
tatttttgga aaaagaagac attatcaatg attgggcaaa gtgagtacta atttccaaat 420
atatatacta caagtttcat ttttttgga ggattcaagt aacagtattt ctaatgcgat 480
attcccaatc aacacgaaac actaaaaaaaa caaaccttca aatgtagaca aaaaccctaa 540
taa atgaggg aaatcataga caaggtatat aagaaccca actgttaata cttcaaaatg 600
tagctaattc catgtgttca agaaaagata aagtctgagt ctcaattcta ctcttaaaaa 660
cattaaagat actctttaat tactacccaa attgagactc ttaaaaacag acaagctctt 720
ttaaagatga tacc 734

<210> 58

<211> 418

<212> DNA

<213> Homo sapiens

<400> 58

ctttagcctg tggctgtgtg tcaaggtag gacagctatt gatgtgtgca tgcgtgcctg 60

tatagggcac caggggaaggt agcaagtaaa aatttagatc atagcaaaga gagaatataa 120
ttcagactct gtctctagct cttgaatagc acctgctcct ctttgtccct cctcatgtcc 180
catacaattc acttctaaag atacagatct tactgaacaa gttttccaag tagggcttca 240
aaataaggtc tcttacagga aaataatgcc taaaactctg tagataccat tggaagactt 300
caaaactcaac tgtccttcca catggccaaa caaaaataat ataataaaag caaataaaaa 360
ataagaacca gacagggggc atgtatttgc tatttcatat acattatgcc aagtaagc 418

<210> 59

<211> 593

<212> DNA

<213> Homo sapiens

<400> 59

gggattatct gatacaattc cttgggaatt ttcaattgcc caattttact actttggtgg 60
taaaatattt tgttaatggg tggtaaaata tccatccact ttgctggata catctacaaa 120
cataaccacc tcagctagta acagtaccgt acatggaaaa gggaggaatc tgtacaaacc 180
tcttttatgg caccatcaca gagtagtagc catttattgg gctcctaatt tcaggaatcc 240
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gctagtcaag cccaagtctg ttacacctaa tcaagcccaa gtttggtata cctctttgag 360
tactattcag aagactacag gctgccactg ccaacttcag gtaaaaaccc gacaactagg 420
ccagttgtcc aagctccatc ccttgctacc aaggccctaa tttgccttaa ggtgaagatg 480
attcaaatta tgacagtctg ccttgccgtc ttcattagag tataagctcc ttgaatgcca 540
caaccattgg tttcactggg aggtgggttct cttatcacc ccaaaatact gca 593

<210> 60

<211> 689

<212> DNA

<213> Homo sapiens

<400> 60

ggggaactta aggaattaat tgtatttgtc caaaccaaac acatcttttag gtttgctgac 60
tcaatcataa taatggggtt agttccatct tatgaggttg atttgtttct gataacctgt 120

ataaaagatt gaccttgcca gtttgtactt atttgaatac aaactacttt tcaataactt	180
tcccccaagac ttgaggtaaa gttcagggat gttataagta aaaatatctt taacctttta	240
aaggcagatg ccacacaaaa ccttgcaaag gaaaacaagg gagccacaca tatcaatgga	300
gacctttaag tctgtggttc tatttctagc atttatcgtg aagaatcatt aaagaggtaa	360
gcaaagatga atgcataaat ttattcagtg gtgtactgtt tctaattgtga ataactggaa	420
atcagtgtag ctcaatacag actgagttaa attacgctgt atccttaca tggaatgtta	480
tgcattcatt agaaatgtaa tgcaagaata tttaatgaca tgaaaagttg ttcatgatat	540
tttttaaata aaaaagcagg ttatgataca atatataagc atacttccag tttttagtaa	600
gtatgtatgt atgtgtgtat ctgaaaaaat atcaatcaag ctgttaaaat gattaataag	660
tcaaagaatt agagataatt ttgattttt	689

<210> 61

<211> 609

<212> DNA

<213> Homo sapiens

<400> 61

cttaaaaaat aaaaaataat gatacaaatg atatgaaatg cttgaatgca gaaaatacag	60
aatattttcaa taaagggtcaa gaacattaaa gtaataaatt tccttgacat cttatgaacc	120
actgattata gaattaaatt tagtgtttgc tttaaaacaa cataatttct gatttgaaag	180
cataggaaac tcagaggaat ttacaagcaa aaagctattt aaaagctgcc ctctctattt	240
gatgaaagat aaagaagtac aagctcattt acttgacaaa ggcagtgtgg cagataatcc	300
aaaacaaaaa tgtactgagc atacaatata ttatgccaat ttgcagtaga cttaaccttt	360
cttgaaactc ttagcctaga acagaattaa tattaatttt gcatgtgatt aactagagag	420
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cttgctgaat ttcaatagct taaaaatctt ttatttgctc tgagctactt gtgagagctt	540
gtagtttaat aaaagttgtc tttaaaatta catggatggg tatgaaacca attttgctca	600
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<210> 62

<211> 665

<212> DNA

<213> Homo sapiens

<400> 62

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acacacacaa aaaactcatc atcattcccc cagggtgttca tttgtcctcc atctctgaat      180
aagtcttcca ttttacttgg gtactatgct aaggaactgg cttactttca acttcttttt      240
tggggggtct tattccaatg ttagggaatc tcttttgaaa tccacaacat tctccaacac      300
tgaaagcaag gaggtagttt taattacatt ttatagatac atgaaaagtt tacaagggtta      360
aagacttcca gatatttttg gaacaactct ttttctactt gataattcct aaaagctatt      420
aacacatgct gttataaaag agaagattta gagcctctgt ttactgctgc cttgtcactt      480
actgccaggg ttctcccaca cacacaaaaa aaacaactaa aaattaaact aagagtgaac      540
ccctgtgtac acaatataac gccacaaaat catttcattt ctgttgcttt aatgtatttt      600
caaagaaaag attaaaagca agaaatcatc taacaacatt tctagatata ggcataatgt      660
cattt                                     665

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<210> 63

<211> 534

<212> DNA

<213> Homo sapiens

<400> 63

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gggggggcaaa acagacaagg tccaaggaga aataagaaaa aaacaaaagc aagaaggaaa      60
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aaggtacaaa aaataaagct gaaaaggtag attgggacca agattcatgc tttcattcaa      180
actgcactta ttgaagctta ctaaattgaa gcactctgtg ctaaggatat gaagagaaag      240
agatacaaaa acttcaatga ggcacaatcc cttcccttac aagggaatca cgcacagcac      300
atccttggtg cacggtaaatt cagcaaattgt ctctaataaa tccagtcaaa tgaaaaaggc      360
aaaagtgttg aagtaggaag gcctaagaga aactaaagag taactaccat ctgatgatag      420
acctaaagcc ctataactcc cttcctctac atgtatacac acaccccaca tagcacacaa      480
cttggttaatt cctatgtaag aatatgaata taacatgtgc agggacgaaa gaaa          534

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<210> 64

<211> 659

<212> DNA

<213> Homo sapiens

<400> 64

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cagcttttttc ttaacctcat taaaatcatc tgaccaacaa atatatacct tatttcctcc	120
tttctaagtt aagaggaaaa aaatcagtaa agagcttgag tatttgagaga agaaatgtca	180
ctgagggtcac tccatggaca tgatttggac ccctgacatc attttaacag ggggggttcgg	240
ggatttccat atactggctt tacatcactt gcctgcctgc caaacaaccc ccctacttta	300
acaagcacca ggtgctcatc cttctatcac agacatgcag cccctgagct tccagagtag	360
ctgtccctgc cagctgctag cagggaagtc agaagcatag aaatgaagaa gcagccaaag	420
ctctgcccac gatacaattt caaagcagct catctttctt aggagacctg ccaaataagg	480
tggccctgac ccattaaaga gacaggcaga cccattaaact ctatggttca cttgtcctgc	540
tgtccagact gcactcagcc tgctttcctg tcaatccaca tatgtgctat ctcagcagag	600
gggactaaca tttatcaagc agctattggg ttatgttata ttactatacc tattttttg	659

<210> 65

<211> 653

<212> DNA

<213> Homo sapiens

<400> 65

gggatgtgta aatggcttta atgaccatat tttatctgtc agttccactt tttgagaatt	60
tgacataatc acctaagctt ctgtgtaaag agactcccaa tgggtattata ttaaactaac	120
aaaaaaatta gaagccacct aaatatacaa caatggggga ttagttacat tattctgtaa	180
gtatgtggcc aagaaaggta cagcaattaa tcatgcttct gaagactagg gatgcataaa	240
aatgctcaca gagtagtaag cagaaaacaa tatatcttct atgcttgtca ttttatataa	300
gatttgtgac acgtatgtaa aatggagatt aaaaggaaaa cactgttaat gagttagtgc	360
tctgtgggta ctggcaactt taaattattc tacactatct tcagaattga acacatatta	420
taattgaaga gaaaaacaag aaacattttt attttttatt ttttgggtga cagagcaaaa	480

ccttgtctct aaataaataa agtgcataag taattattat gttgtagag tataaataaa 540
 tcggtgtaac ggttctagaa agcaacctag ggatgtgtaa atggctttaa tgaccatatt 600
 ttatctgtca gttccacttt ttgagaattt gacataatca cctaagcttc tgt 653

<210> 66

<211> 567

<212> DNA

<213> Homo sapiens

<400> 66

atttttcttt taaataacat ttgtttacaa gctaattgttc agaactcagt ttactgagc 60
 gttcccatac tggcaacttt tcatgcttat aaattggcta ttgggttga cagaatatat 120
 tagctagcta attgttttct tttaaaaatc aaaatacttg tgaacaaatt acttagcaag 180
 cagcaaaaaa catttttagaa tagaatcaaa agcttcacct tccaccataa atccagttct 240
 tttatcttgc attcttcata ttaatcatta aaactgttga actaaaactc tgaaaagaaa 300
 ttaaaatttt tttcctaaga taggctacta gagctagaat agattatttt ctgtggctgt 360
 agtaactcag gacaatgata gatgagggtc gaattacagg gaaaaggatc aatactctta 420
 tttttcctct catttcatcc caaaaactag gcgtcagagc atatatgatg aattccactg 480
 gggcaaagca ttctggaagc taaaattaga ggtgggaact ccctgttttg tgtgaataac 540
 aggaagtgga attgaaatgt aatgcca 567

<210> 67

<211> 647

<212> DNA

<213> Homo sapiens

<400> 67

gggattctct gacacctcct tggctttctc cagttccttc ccagcctgag aaacactcga 60
 cggttgcttta gggatgtcat aaatattggg cttggtgttc tgctgttcca ctcggggaat 120
 cagaaagctt gaaggaacct tgtagctgac atcttcatcc aaaggaaatg tgcctctggg 180
 tacaagaaag ccataagaag gaatttctgg aaggctgagt tttttctgca tgggcacatt 240
 gttattcagt tgtggagtga gggacctgga tctgccactt ggaggattgt agaaagtgga 300
 gctggaactg gggagagcgt ggggccttga ttcttccgca aagctggtga gaggcgtgtt 360

tctgacgctg gcctttcctg gagacactgg agtgtcataa atccattccg atttctgagg	420
atttggtaat gtgctgtaac cgctcttct taaggtagtc actgatata ggggaacacc	480
ctgcccctgt gggagaacca cacatagttg ccgggttagt agctttccaa agagggcgcg	540
agtgcgttgt ttaaattctca tcgtcactcc gccgctcctt cagtggctcc ccatttctgt	600
taccactcaa ggtccttcag gattcttttg agcctcattt ctttcga	647

<210> 68

<211> 613

<212> DNA

<213> Homo sapiens

<400> 68

aaatgtgcca acatatatta gcaaggtttg tcagtactga ttaatatattt tacattctaa	60
tattctttgt tagaattgta tttattttat gaagcccctt ttgaatctac agcagactac	120
ctgggaagta gttatagagg tcatcatcgt gtcttggtga ttcactttgg gaaattttgt	180
tgagtgaggc tgggtgaacct agaaagctgc ttcttctgcc tccccatttc tgtccccaag	240
gccctgctgt ggttcaaaag cccatataaa cctgcagttt ccctttcttc cacgataggg	300
cgcgcaccta cactgttagg gtatggggcc gactggctcc tgccctgtgg gaggtttgat	360
ccttgtccat ttagaggccc ttccttattc atggacactc tactgagtgt ctgttgcaaa	420
ctccctggta taaaccccag acgtcatgga tttaccacac taattattag agtggccatt	480
atttgcaata aaatagtgac ccttgccact gtgttttcct accaaataaa cttactgaca	540
agtatctgca ttggctgggt cgaggtgtca tcaaatacgc ctaggtttgg atgtgctgtt	600
ttgctagctg tag	613

<210> 69

<211> 635

<212> DNA

<213> Homo sapiens

<400> 69

ggggggaaaa ctgaaacaaa gttggaaatt atttggttaa ggatatatag cagaagaaag	60
aatttaattgt agcctaattgc acactttgac catgaattat gctctacatc ttttaagttt	120

attcagatca ttagttttat cattaagaga catttgtaa gtatattcct tattcaaagc 180
ttaaatccat tttctaatta aattagacaa cactttcttt acaagaaaat tgaataatct 240
gatagtagct ttcattagaa tcaaagtta gccttttatt ttgtttttgt tttttaagca 300
ttggcagctg tttgtgaagt cataagaaag cgagtaaaga ggtaatttat taattagatt 360
gaaatattaa atctattcct tttttcccaa gatactagtt ttcccagaag gtacttgtag 420
taatcgttcc tgtttgatta cttttaaaacc aggtgagaaa aattaaatta tgtattctaa 480
caaagtaata tgtgagatgt tgcaaatgat tttatagaaa tacacaaaat aactctttag 540
cttgctctga gcattttttt cttttctgat agcaactttt taacgttggtg gatccacaga 600
acttactgct ttgctttctc ttttgggggc ataataat 635

<210> 70

<211> 623

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 70

gggggatttg ctgatggatg gatgtgggct atgagagaca ggagtccagg ctgactccca 60
aggttagaga actagcactt aagtgtcata catttctgcc tgacttgagg gtcttttatt 120
tttcaactaaa tgattttaga gtctcaagta aaaattcaaa agacatagaa aattttgccc 180
caaaacttat ttaatcaaag gatatatatg aacacttgag atagtatcac cttgctgcta 240
gatctttata ccttttggaa atgcctttgc caaagtgaac acttagttaa tcatctatac 300
atgtctctgt gtgcccattt atttggcctc aaattgaccg gactattatt tagagtaaga 360
ggatgacnnn nnnnnnnnnn nnnnnnnnnn nnnctcttg acctaaactgt atgacccaac 420
ctttaaaatg gtggttactg ggaaagcacc aactctgact gtacatccta cttcagaagg 480
gcaaagaatt acctatctaa acttctgga atttcccacg actctcgtag ttgcacagta 540

tttgacagct tggaaagcac tgttttacaa aaagtgtttt ataatccttt agctttcctt 600
taaaggtagg taagattggt ttc 623

<210> 71

<211> 573

<212> DNA

<213> Homo sapiens

<400> 71

gagaaagaga atgaatgttt ataaactaca ctaccccaca atttcataaa aatcgtttga 60
ttgctgatgc ttccttaaaa gacttaaagc agggtttgt gaggcagatg atgttacaga 120
gcaataattg gacaagttcg aattacttct ggacaagaaa caaagccact actacaacat 180
aagagaacag ataatcagct gaacaatcta ataccctct ccccaaagcc ttccatataa 240
aactctgttt tcatcattta gaaattaaaa taaccctacc atattgtctg ggctttctta 300
gctttctcca tcaaattaac ttcctaactc caaatttagc ttttcttaag gcttaaaaaa 360
ccatcttcct ccacttctca cttcataaca aggaggctgt cacggaaaac acccaaata 420
atttcacca tgtccctaag taagagtctt ggagacacag ttaaggccat ctctggagtt 480
ccaggttgtc tgtgaggtag acctggtatc tgaattcaag taaagacctg gaataacctca 540
tcgcctgaat tctgaacagc agattcatgc tgg 573

<210> 72

<211> 630

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 72
gggggacagg cgacgtgggg agtgtctgtg gtcacaactg ggggccccag cacttagagc 60
ctgtgactca gtatgtacac gtagcaccaa atgctttttg gttctgtctt gggcatctcc 120
gcacgggcac ttccgccagt ggtttcttcc attgcctttg ggatgagcag gcctcctgaa 180
agcaggcctg atatttctctg gtcttctgac aaagaatggg aaatttctca caccgtcnnn 240
nnnnnnnnnn nncctgggga tgggatttga agggccttggg ttgccgaatt gctcctagaa 300
ccacaggctt agaggagttt tctatgaaca gcggtccttg caggacaga ctgaggatcg 360
gtagggctga atgaagacaa tcccacctcc ttcaagagcc acctcaactt atgttttttt 420
cccacaaagc ccccccccg attttgccag ccttttactg atcacatcat ccactttctc 480
acagacctta caatttagca ttggcttata tattgcctta tattgaataa tgttttatgg 540
tcttgttttt cctaccactt ccttatgtgt agagactgtg atccatattt cctcttgatc 600
cctgtaaaga tgctgagcac acagtagggg 630

<210> 73

<211> 625

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 73
ggggtcagaa tgctggagct caagctttgg gccttgatgc atataataac tcataaaatg 60
taatattcag gaaggaatga ggctcctaaa gaagtgagaa agtagaatga acaaaggcct 120
aagagaatag aaatgtattc taacnnnnnn nnnnnnnnnn nnnnnngtaa gagtgccag 180
gggtattgag attgttagat tattttataa tgatataact taagggatc caaaataatg 240
aacataaaat gttattatta gatttttttc cttttcacat acttgaagga caaattatat 300

catattgtct ttttttcttc cccaatacta tgagcgttag agaatgagac gcaaattccga - 360
 tatgtagtaa caaggtagtc actcacagca aaagttgaaa gattcctagt ctacgctaac 420
 aagtgtctgc aaactctaca gaaatgcaat tagaggttgc ggcagctact ccctgccta 480
 aaacagcagt ctgaaaactg ccaatctggt gcaaattctg tcttttctga gaatatttta 540
 agaaaagtgg tagagaaata ttgaaaggc aacagaacac taattatata tagacaagtt 600
 tccttttttt ttttcccaaa aaata 625

<210> 74

<211> 736

<212> DNA

<213> Homo sapiens

<400> 74

ggggggagaa agaagaaaca gattacatga agtataaatt aagaataatt ttcattgtccc 60
 tactctgaga agcaaattca tccaagtctg agccaaagag aatgaatcag aattctaagg 120
 tttctgagtg tgtcttctga gaaaaattca gagactattg tgtacatttg tgtatattac 180
 ctttaaggac attaactgac acttccagag aacagaaatg taaatctggt aatgggataa 240
 cgaaactggc ctgtgtcctg tgagctgatt gacagaagtt tagaaacgct gctaaacttg 300
 tctttgagcc ctgataggag agaaagctca gcccatgtca cccctatcaa gtgagtggag 360
 tgggtataaaa ggaacgacca gcttgggctt aaaagctgta attctaggga aagataagaa 420
 ataggctttg agatttgctt attgctaaat gtacagttat tagcctgggc atggaaaccc 480
 cttagaaatc attaaaatga gccgttatgt tgagctcttc taattttatc cttatgaagc 540
 catgatattt atatttccat taatagttgc atgaatctca atttacattt tgaaagttgt 600
 caaagaacat gaaacaaagc agccaggact ggcacatttt ttgaaagttt tagaatcttt 660
 ctgttggtga caccagtggg taaagaaatt tcattcttta actataaaag acacatgaca 720
 tctgatgaat tagcca 736

<210> 75

<211> 607

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 75

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ggggtgtgtt ttggagcagt ggcagtgagt cattatggaa tgaagcttca gtgctttact    60
tacaagggga attccagaca tcagcctgga aaatgaagct acacaggtgc tgccttggct    120
gtgcgcatag ggctgtgcac tgttggtcat atgaggggct gaagtgaggt cataggtgtg    180
agaagcattt acttggctac aagtaaccnn nnnnnnnnnn nnnttggaca agcactgacg    240
ttcaccattt gagccccact gcaagccctt gatggcatct aactagtttt gtacaacctg    300
ctgaaccata caaagatatt cactgggggc ccatcccctc caggccctaa aaatcatact    360
atttctcacc ttcacactgt gtaaccaccc tctataacta gaacatttgc tagtctcttc    420
tctgcataaa agtgatgatt catatctctt tcatctctgt tgggggttct gacctatgta    480
cttgtaattc agtcctcatg tttaaattct acacaaattt aaatttaggg tgttgagtgc    540
atagtggaca ctgtaaatat ttactaattg actaagtctg tggcattaac ctaaagcatt    600
atcattg                                           607
```

<210> 76

<211> 615

<212> DNA

<213> Homo sapiens

<400> 76

```
gggaatgtta tcttctgggt ttggcctcag ttcataattcc actgccccaa acaagatgct    60
ctaagaagca gtacagagct gagaactaca aaatataagc gacgtatatt ttctggaaca    120
tgctagtaga ggttacctga ccacaattag atatattctt gtactaacaa aatatgcaca    180
ctaggaaagt cctgctgagg gctaccacat taggacagag aaagaactcc tcttcccttt    240
atccaaaagt aaacagcaac gaatgaagag attgtaaaaa tagtaagaag gagctgacag    300
ctctcctaca tccaggcaac acatttttgg catgcaagaa aaaagtgacc ttattatttt    360
```

tttaagaact gtttcatatc caagagccca tataaatctc ttcaaagggtt tttaagatgt 420
ttaaaagcca ggaaatttag atgtttcagt accattaatg ctaaccttgg cactgcaact 480
gctaccaatc aatTTTTTcc ttttagaaag aatgcataat tttgatgaat gctacagcaa 540
attacacact aaaaacgtaa tttttcatgt gaatggggcc aacgtctctt ggcatgcttg 600
tcatcacaat atagc 615

<210> 77

<211> 403

<212> DNA

<213> Homo sapiens

<400> 77

gggctgtctt aaggaatttg gacttcatat aaaggacaat gggataccac tgaagggttt 60
taagcaggaa aattgcatca gattgacgta catttttagaa aggtccctct gtctgcaatg 120
ctgaaaatat gttgaagaga gtataatcag agggtgagaa ctggatgctc ttgttaatgt 180
ggccacagat aatggatggc agtctggccc atgggtaccag cactgagaac agtgagaagt 240
acaaagattc aaatgacaat taggagggtc aagtggataa agggagcaaa aaacaaagga 300
gtcaaagatt actcccaagt gccaatcttg ggaaatttga tggataatgg gaaaccagga 360
tattccctaa ggtagggatt tgtgactcaa agctaataat aat 403

<210> 78

<211> 632

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 78
 ggggtggaca catgcgagat ctttttggag acagagttat caggatggac tggatgcaga 60
 aggagggaga gaagagtcaa agagcaattc cctggtttct ggcttaagca actggataaa 120
 tgagagtgcc acttactatg tttcatttgg caggtgggtg gggaacattt aaaaccaaga 180
 gctccattta ggacagaaat tgagatgcct gtgaggaatc caagaggaga tgtgaannnn 240
 nnnnnnnnnn nnnnncctgg actcagaagg aaggtccagg ctacagatat agaggcatca 300
 gatatagatg gtatttaaaa ctttaggaac aaatgaacc acccaggaga aggccagaa 360
 ccaagcctca aggagcagcc cttagaggcc ggggagttag cagagagtta ggaaaggtag 420
 ctgagaaagt gtggccaagt tccatcctaa ctttgtgtcc attccctcca cagtggatgg 480
 aggcttcggc tacctgaaag atgcaatgtg gtgggctgga tttctcacca gtaagtgggt 540
 tgtttggttac taataacagc ggcctattga tagcagggt ggagacaaag ggaggggtgg 600
 gtagggcatt tttgtctcta gtatggcaag tg 632

<210> 79

<211> 742

<212> DNA

<213> Homo sapiens

<400> 79
 gggcaacttg aattgcttat tttaaacagc cctcttcagt gtagtttggc aaagctctct 60
 ctttcgggtt tatttgttta cttacctact tatcttcaac aactgacct acccacctgt 120
 gtatcttatt tggttaacat ttatccaagt ttgaagatgg aaatagtttt cctctgaatc 180
 agaactttca gtgtaactgt tccaagaaac cgccaccaca gatgtgggaa gagggaggag 240
 aatgaggaag attcctgctg tctttttacc gcttgggttt acaaatgtgg caaatgtgga 300
 aaatgtcaaa aagtaggaaa aataaaatga aacctgagat ctccaccac agaaataatt 360
 atagtcaaca tattgatatg ttttctcttt ttggaggaaa aaagttacag atgaacagaa 420
 atttgaanaa aagctgtgcc tattttctgt ttcttttatt acacatttta ttatcaatga 480
 atactttctg ctgtaaaaaa tataaatgat acagaaacca atagtagtgt tcccctttct 540
 agaagaaact gtaaaagggt gtactgttca tggccctat tcacgcttta aaggagatgt 600
 ccagctccag ttgaaaatga agttttctta cctggcaatc tgggtgtttct gaatgtgatt 660
 tgaaatccgc caccccaatg agaatgagga cagttttgtt ttttttctct gccagaggg 720
 atcgatcgta ttgattaatt ga 742

<210> 80

<211> 544

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..() ..

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 80

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gttggtatta ctgtagtat taatattatt agaattattg ggactaggat gtgggtcagg      60
tacctgaaaa gccacagtgc accctcagtc ccaggagatg gcagatctcc cctcctctct      120
nnnnnnnnnn nnnnnnnnnn nncagctgtc cttttttgcc tgctcttggt tccctagtgc      180
taactgcctg cccctccttg atcctcagtt catacttctg agacaaggaa ggacatgagt      240
tgctcgtgc attacctttt ccttgctctgt gccgagcttt tcaggacaga ccagctcaca      300
gcctgctctc cagcctgagg cctggctggc ctggtccagt tgacctgggt tggggtgagc      360
ccagctctag ttgatctcag aaggggaatg tgggcacaaa ggaaggctct ttaattatgg      420
gattttcaat tattctggaa agaggacttg aagagtataa aagaaagggt aaaataaccc      480
tgctgaagtg gcaagatgac ctttgtcatt tcccacctag cataccaatt cgattccttt      540
tcaa                                                                    544
```

<210> 81

<211> 636

<212> DNA

<213> Homo sapiens

<400> 81

```
ggggggagtc agggccggaa gcaccggggc gagcgtctaa tccctaatac ccaattttgg      60
tggcgtgcac ctggcaaact gatgattgtg tgggacgtct aatctctagt cgctcaccoc      120
```

tctactttac cacagagcta gaaatcgatt tgaggaaatc tggatatcaat gagcggggcgg 180
ggagacaacc ccacccctaa tttccctggt tacggaagtt ctttcccggc ctctcagac 240
tgggtgctggc ttcttttttc tccacacttc tagctacctt gtttttatcg ttttcggcac 300
ctgcccttcc ccagcgcccc caccaccccg agcactatgt atgatcgggc tccccgcctg 360
ctcaaattgg ctgaaggtgg cagcactgag gcccatgtgg gtcctggatc ctaccaggta 420
cctttcctga agcagcaggc gacaggtaag atgtaggaag aggcagagct cctgtgacag 480
gcacccatc ttcagcctgc tccgcttctg cgtgcttgtg agttaaacat agagcggaat 540
agtaccatct tgtaaacata acaaaacatg aagtaggcag ggaaaacact atacttttat 600
tttacagatg agactgatag tatcacttgt cccatt 636

<210> 82

<211> 570

<212> DNA

<213> Homo sapiens

<400> 82

ggggaatctc tggacacttc ctacttttagc agtactcaaa gaatagatat tacggccaca 60
atttcatatc agcaagactt aaacagtgtg cctttttctc acgacaacca atattatttg 120
ccagaaatct caccttactc aaaaaaagtt gtcagagagc tatcaacaga caagttatcc 180
ccaacaaga gggaagacac ttggtgcaaa agaaaaggac tctgagctca agctaaagtt 240
ccctgaaact ctaagagcac ttgcaccttt cagactgtat tcttggcaat taacctgtgt 300
ttaaaatgct ccctattcca aacaaccag gttcttccct gtcccacaaa tcggaagact 360
tttgtttcaa agtctgttga gtttaagtga tatggagaag gaaatatttc aggaccatcc 420
atacaacaat ctacttttaa aaaaaaacat gaatctcagt ttaggttcca gaacaatttg 480
gtgatctgca ctttaaaactt aatttgcata aacaggatgg aaagtatttt ccaaaccctt 540
aattcacaac accctgcaca cctgggcctt 570

<210> 83

<211> 526

<212> DNA

<213> Homo sapiens

<400> 83
 gggggaattg tgcagaacag agagatggaa ggaggaaagg aacatgacaa ttacagaag 60
 aggggctccg gcaccagaa ataacacacc acacctcagg tttcaggga caagaagtgc 120
 tagacaaaaa ccataatgat tttaacagga aaaaagagc aacttcagat accactccat 180
 taaaaactt aaaaaaaaaa ctttctggaa ctaaaactga gttttaaatt taaaagttag 240
 taatgaattc aaagaaagga aaacgaagta gaataaacat caaacagaa acaatggggg 300
 agaagataag agatttggag gacatacttt ttccaaagca gtttcctcta tacttttagga 360
 gttttacca caacgcctg tgctgtgtct tttcaaaata tcctaattgg aactacaggg 420
 atcttaagcc aggaaaattc acttctatcc tttatcgctt ctcttgctgc ctccatctgt 480
 gtctttttct ctttctggaa ttcctactat tcacattatt tctcct 526

<210> 84

<211> 566

<212> DNA

<213> Homo sapiens

<400> 84
 gggagcaggg gcaggctaga tttccagagt tcatcgatgt caaagccttt ctctgggggc 60
 tgttccctaa tcccaaagca gttgctttct ttggctgcag aagctgccct ccctctggtc 120
 cgcattgaga ggaagggtgc tgccttaagg taactggagg ataaggctcc gcccttccca 180
 tgagagaggt gctaactcac tctcccacca cacatcctgc catccatcct gactttggcc 240
 ccagggattt cagggactcc agcccagcat cctgggcttt ggcacctgct gcctttagca 300
 gtctcacc ctttgtgaag tacttggcac tgcagcgtgc tgactcgacc acacctacc 360
 ccagcctccc caggcctggc actgccacta ctgcccgtac ttcttcagcc acccttgaga 420
 agcgagggtc tcactcctga gccagtcag tggctgggtgc ctgctcctca atgatgggat 480
 gatggactca agtcaattca cactctcaa aaaaaactc agctcttcca agggagcaca 540
 tctgagttcg ctctctcaa tgaagc 566

<210> 85

<211> 653

<212> DNA

<213> Homo sapiens

<400> 85

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ggggtctgag ggcataaggaa ggtggcagtg gttagaggaa aaacaatgtg gtgttgtgaa      60
aatctagaag ggagtcataa agtgcctagt gtttgagtca agatgaagac aaaaactgct      120
cacttaatta agtaacatgt aggctggtga tttttcaagg gctttatgga gtgatggggg      180
caaatcaaag accgggatgg gttgagaagt gaatggaatt tgagcaactg gagagaacaa      240
gcaaatttac atgaactttg gctgtgatag taaggggagg atgtagtagc tgggtgctga      300
gctttaagat aacaaaagtt tcagcatatt tgaatgtagg tgggtacaat cacattgaag      360
gggcatagtt gaataataag gagagaaaaa tctaattcac agtgagagat tcctaagtag      420
caggagatag gattcaagac actaagactg ccttggttat caggaaagct cctctaattg      480
aacagtaagg agtgggggtga tatctaaatg ggtttctaag ctggaagtga actaacagag      540
ttcctttcat aaagtttctc ttgccactg ccccccactg aaataggaaa gggcatctac      600
taagaggggg aagcaaggag ttataggctt gaaaaaattg acttctaaat agt          653
```

<210> 86

<211> 609

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 86

```
ggggcagcag aatgaatata tgcacattgt tctctggagt ggccttcct ttccctgaag      60
ctgaggggtct gtgggagcct aaggggctcc ataaatctca gcactagtat attccagggg      120
atgatcgcca gcagcattaa gagctatggt tagcctttat gccatactgt atctttannn      180
nnnnnnnnnn nncaaattct gaaacaaaac attaaaatgt gactcactcc aaacagaaag      240
```

atggaaatgt attcctacta agaaatatgt gtaacttcta gaaaaagaaa aaaaaaccca 300
cagagatttg ttttcaacat attgtttttg cttaagatat atttttactc ttaaaaatta 360
agaaatagaa ggccttttat tagaagcagt gtagtgtcac agaatgacaa agcacagtat 420
cagcagacag aaaacgtggg ttctaattctt gctttcccta cataactctc aactggttat 480
ttaggttctc aataaagtag aatgatgaaa tacgtcttct taatgctatt gtattttgtt 540
aatatttaac actgttgata tcaagatgag atcttataag tagctggaaa actatcagtg 600
tagggaaag 609

<210> 87

<211> 587

<212> DNA

<213> Homo sapiens

<400> 87

ggggaaaaaa aaaattcagt cgatttaaga taaaaagata ttcaagtagg caaatagggtt 60
ttttaccatt ttttcctttt tgaatgttct aacattgttt agttaatcaa ctgataatca 120
tcatttatag gatccgagtt tcttacagcc taacagaaat gtgaaaagga tatttatagc 180
gaaacattat tttcccaact acaagagaaa atcaaataaa gttaaataaaa tttatgaaag 240
tttgctgtgc ttaatatgaa ttctccattg gtctgagaga tgatgctctc ctttctttgc 300
acagagtgaag agctagggtg gaatttgggc aggaaataaa gaatagagca agatactgga 360
acttggggga aaaatctaac tcctcacggc tgaagtcttc ataattctgc atcagtgcc 420
cagtctacca gaaaccaggc cccctagtgg attaaaagag ttaaggactg aatgccacat 480
gagaatgatt tcaacactga ggttgtggaa attaaataca agaacgatat ttaattaaaa 540
atcttattca gtcactcatt tagcacttct ttttcttttt ttogaaa 587

<210> 88

<211> 589

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 88

```
gggggtagcg aggtgttttc gcttagattg agtctatccg atatctacca acctcctttc      60
cttggagggg cagggaaagc tggatgatcc tgaaatgttt taagtgttat tttttttctg      120
ttgttttaaa tctagttctn nnnnnnnnnn nnnnnnnnnn nnnnagtctg aatccaaaat      180
ggctgtagct tggggaagtg ccctgccctt cgattactta aatacattaa cgtttaaaga      240
ttttagtcct ttcccctgtg gggacattaa ctgaatcttt tgatatattg gttttttgca      300
gttggtgtct cacctttaac tctccttatg ctgggtgaaa acaaagggtga ggctcacaaa      360
gttgactatt ccaaaagttt acataaaaaat gggatgcggtg cgggtggtgtg tgtgtttaat      420
agttgcttat agttttgaaa ttgtgctgtg gtgtcaattt tatctgccaa cttcgtgctc      480
tgaagttggc ttgtcatatt tgttgaaata tttttaacat tgacatttat tgcttaccag      540
aaaaatacag ttaataatag tggttcatgt tttagtttag tagtaagtc                    589
```

<210> 89

<211> 573

<212> DNA

<213> Homo sapiens

<400> 89

```
gggggcggga aggagaaatt ctgggagtat ccctaccctc actttctatt acatttagtg      60
caaaacaaac attttaaaaca tcaagctctt attctaactc tactgtaatt actaaatata      120
actgaaatct gtattccaca ggtaacaact tcctttgaaa accttctccg gaggagggtg      180
atatatttcc ctcaggaggt tggaggaatc aacaccctca ctccccaaca gcatttctag      240
accactgtat atcactgttt cccaacacca gcctcgcttt tgaaatttac gtcagtttcc      300
acttctgata tgaggtcctc cttgacaccc acccctagaa aaattcctcc ttcctatggc      360
tcatgttact cagtttttac agccaggcaa caaattcata agtggacagg atatatctat      420
atagaaaact ccacaatcaa actccaattg ctattagggt gtgtgtgtat taacactggg      480
gctaagagtc agagtcagac taacactggg gctaagaagt ggggtgaaaa ggaggaatat      540
```

ctgggaatat gaccgggaaa attacaagta aca

573

<210> 90

<211> 589

<212> DNA

<213> Homo sapiens

<400> 90

gggtgatctg agatgggagc tggcctgagc ttctgctcac cctggcactt ctgttcgccc	60
acttccttta gcttgggggt ggctgggtgcc ctctgggcta tgacaagggc cctcctgtgg	120
ggctttgcat ggcccctgtg tccatctcgg gacagcattc tagcaccatc cagcttctct	180
ggagtgagac tcgggagttt tcagtccact gaatgatgcc taatgacagc attccaggag	240
gaatgcatat gcattacagg cccccaccgc aagggggggt gggctgtgct ctccactcct	300
ccgttcccac atgacatcag tcttgtgaaa agctcccctc ttgcagagtt cagctataag	360
gaactttgtg cgtaaaatgt tcttcagctt ccaactcaat tctatagcag tcgaagaagc	420
aggcctgaaa gttgtcaagg gtaccttggg tttaaccctt tggatttaga ggataatagc	480
cagttaaaaa caacaacaac aacgacactc acacattaca ttttctgttt ttctcagaat	540
ctctgaaaaa ttggacaatt cctaaaagta tgaaaaaagt attccttgc	589

<210> 91

<211> 711

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 91

ggggtgtgtg gtgggtgtgt gaggttaagg gagtgaagg aggtgggatg cactgtaggc	60
--	----

agggggctgg gtgtggagag tacatgctgt atgtgcatgt gtatatgcgc tggaggtggg 120
 ttggaggtat gtgggatagg ttacagaaaa tattccaaga tgatatatga gacatcttct 180
 ccagaaacaa aaatatgaat tgcatttcat ttctgtatta caattcttag tgctacagaa 240
 tcacatgctg ctcccaatgt ctgcagggtc aatggaagag ccaaaaacca tttaaannnn 300
 nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnntc ggaggtaaca catatttcta 360
 gtcagaacac ccctgggtca gtaggtccag agtatggaca gagtctggct agcaggtcag 420
 gaggccaaca ctggagggcc tggctcagca agtccttgct ttccctggga gtccatgttg 480
 tcttttctct agtgcacaaa gcctaagggg ctcaaatca caggacgcag catacccact 540
 acagtgccat ggggcaccca ggaaatgtct gaatgttttg ttaaaataag tttaagagtt 600
 gtctctgctt acaaggaact gcctgtccac tgaaaggggtg gcatgaattg tgacttagaa 660
 gcatgaaaaa acaaatatat tttagcagct accactgcta ctactactac t 711

<210> 92

<211> 652

<212> DNA

<213> Homo sapiens

<400> 92

ggggtggatca gatgtgtgaa ccctgggttta ctctcccagc atggagatca cccacccatt 60
 acctcacaaa gtggttggga ggagtaagaa ggaacatgca tgggaaaaaa gctttcagtc 120
 tgtgcaaaat acaaaatgtt ttatagtcta aaacatagtc ccctgcatga acaacatcta 180
 tccaaggoat gtaaactctt tatgtatggc ctttcacaga accagcttgc tagctcctgc 240
 ttctctctaa agaattcaca ccccagggc ctggggagac ctacctgcgg ccatacagcc 300
 ttcaaatggc cgttttctgt gcgatgctga tatcgatgag ctctgacagg ctgtgtttac 360
 agtgcaggag gtcggagtcc tttagggcat ccatcagctt gtttgccgtg ttcccagcaa 420
 aagatctctg ttgaacaagg gactgtattc ccaggaggc gaggtactaa ggggacagat 480
 ataccacga cccaagatag agattacatg acagaatttg ttttgctctt cagaaatgtg 540
 gtggatttca catttcatca catgcacagt gacagcacta tttaaaagga aagtacctat 600
 aacctggcct taaccctgag ccatacagga tgtgttcctg aaaaactggg tc 652

<210> 93

<211> 507

<212> DNA

<213> Homo sapiens

<400> 93

```

aatagaaaga aaagaaaaga aagacttgcc acagagcctc attccctggt atttcgaatt      60
ctgtagtcaa acaatgtcat cagcccatct ggtactgaat ctgcccttca agaaagaagt      120
tttacttcaa tatcacaaca gagggaaacc cactaataat aggttagtgt catttactat      180
ttcccaatat gacataagac ttagtttctc atatgcctgg gggtggcgaa tctgagagac      240
tggaataata ataaataaat catcaaaaga cccctttgaa cattgatata tgtgacattt      300
gctgtcccat gataacagac accatgctgg gacaggaaag ttagcaaata aaacgtttta      360
gcacatgggt tagagaggcc attatgcctt ctacaaaata aacttctcca tttaaatttc      420
tgggcataat gatttctcat cactgatcag tatgttttaa aaggtgatag cctacacaga      480
gcatgattta ccaacactga ggtggaa                                           507

```

<210> 94

<211> 515

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 94

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ggggattggt aaaaatctat aaactatcaa tataagatac aagcagctaa attcaatata      60
tcagtgtca aacagttgta caatctcctg ggaggtccat gacctctgct tgctcagtgt      120
cctcacctcg catctgtatc caccaatgaa gtcactgcat gttgccccgt gctggcaggg      180
gttggacgca cactcatcga gttgctcctc acagtagctc ccagtatagc ccagggggca      240

```

```

ctgacagnnn nnnnnnnnnn nnnnattgat gcagacacct gagtgctggc acaagtgttc      300
aacaagcaca cctgggaaac ccagtgaggg agaaatgtca tagaagaaca tgtgacacat      360
ggggttcaaa tcaaccaatg agcaagtaaa tctaaactgg ctgacacatc caatcttatt      420
cttagccagt tcttcacaac cctcagtacc agatgcatat taaaaataaa ccctgaaagt      480
ggaatatacc ttagtttcat ttcaaataca ttctt                                     515

```

<210> 95

<211> 543

<212> DNA

<213> Homo sapiens

```

<400> 95
ggggtcttac aaggggcagg ctgagaacgg gaacctctc actttgcccc attctagtgg      60
ccaaagcaag tcacaagacc aaaccgaaac tcaatgggca gggaaataca gtccgcccaa      120
gatgagcaat ggcattgggt tgaatggagg acaggaaaga attggagtta atccttcaat      180
ccctcacagt atggagggca gggctctgtt acaagcagca agaggtagcc aggaaggcag      240
ggcctggctg tccccaccag caccacagac acccacctca gcccaaagaa tggctcagag      300
ccacgctttc taggcatga aaggagaggg gccctttccc tcgtgacccc agagcagatg      360
gcagaataca gtctaggagg aagttccagg aggaacatga gaaacctcac aagcctcgtg      420
cagtttagtt tctgataacc acttctcttt ctttgtctca tgtttccctt ccttcgtgaa      480
gttcctagaa agtgtaaatt tttccttacc tttaattttt tctttaattt ttctttacct      540
ctt                                     543

```

<210> 96

<211> 652

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 96

gggattgtat tttcagaagg aagctcaata cataatagct gtgcgtgagg ctgggtaact 60
tgcagaaaca aatagccac ctagaagatc tttgcttcct atttccaaag aaatgtaaag 120
gcatggagcc agttgatttc ttaacatgca ttggatcact tttttcaggt tacataaaga 180
tatagttata tttttcaaata taagtttttag aaaaagacat gtaaagtgtga gttaccttga 240
tttctttcca caagtcagaa aaagaagtag tctctgttac ttacaggaac ctgtttatct 300
tggtatccat aagtatataa atctatagta ttataacatg tctgatgata atttatagta 360
gttggcaatt tgggnnnnnn nnnnnnnnnn nnnnnnnnnn ngttttcagt attggctgag 420
taagctcata ctgaattgac ccttctgcct gtagagcagc tctaaagtct ggacacagga 480
ccaaaaacga ctatttgaag gtagtggaac gtgagcaaaa ggaggcagga gaacaggaga 540
ctggacgaag ggaatagcat gggcgaattg tcccatTTTT ttcagacttt tagcttgagg 600
gcagccacag ttgacgacat gtgggagagt gatataaaat tcatggtctc tc 652

<210> 97

<211> 671

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 97

gggtcactta aacttagaaa tttcatcaag tgagcacaca gaaatctgta aagatattct 60
caagactatg tttagtatca agagaaattt ctgacacaat gcaactcccag aaacagggaa 120
actggaaggg aatgtgagct cattcttgga caaggttcaa ctactggaaa agcaattaat 180

ttgcttttggc tgtgctaata taggggaatt agaaagtgtg acacaagaca aatagaaata 240
attagttctc caaaatgatg ttctcattaa tatggttcga acagtagaaa taaaacaaca 300
ttattgtggc atgtctgcat tctgtcccta accatgggag gtaggataat gcactataag 360
catttttata tttatagttt aaatgattat gtttttttct aaagaagaat ttatatcaaa 420
gagtttatat gcttagaatg tctaaatata tacatgctat caaattaata acacactttc 480
cataaccatg catttgtata ccaatttttt attttgctca tacaaatctg tattgtaatg 540
nnnnnnnnnn nnnnnngggt tcttttttctg ttacttaaatt attttcagat cacttttatg 600
actcttgaag tataacattt ctcagaaaaa aaattaattg tatttatgct ctatcttaaa 660
gaagccactg t 671

<210> 98

<211> 638

<212> DNA

<213> Homo sapiens

<400> 98

gggcctgaat ggtgagtttt caaaatctca tcttctttga tattggatga ctaatacagt 60
agtaaagtat ttgacaagtg ctaggtgggt tataaatgtg catgtttttg aaactttttg 120
tttatgtgcc tcgctgaaaa caatgtgtta gttcaggaat aaattatatt tggtaaatga 180
gtgtattcta tacttaatta aaattttttt tctttgtctg gttatatatg taatgatggc 240
gggagtccca cccgccctag aaaattattt tctttttatt tgagtcgttg tctaggtgca 300
catacaattt tatgtaagta taattataac atttttatgt ctgtatgttt tctgctacat 360
tgttttatca ttgctgttca tagattgatt tgagaaatag ttttcattga agtattattt 420
gaaagatggg ctaggcaggt agttcagtat tatactggct gttaacagta gcctatctag 480
gattcagtta gcattggaca taataacgat taattgacct ttgagtctct tacagatgtg 540
tttggaaccc gaatatggaa ttctcatgga attttgagat ccatcacatt gtagtgtggc 600
ttcccccccc gcaaaaaaaaa aaaagaaaag ggtaggc 638

<210> 99

<211> 700

<212> DNA

<213> Homo sapiens

<400> 99
 ggggcagttt gggagtgggg agaggattgt tttgactgat tgagtctgag atagttgttt 60
 taattccgtg cccatgactg aaagggaaact atctagggtc tgcagggaga agagcagtca 120
 tgttgcataa tatagcaaact gaggaccacc caggtgcact gaatggccac cttttccaga 180
 ttgtagatcc actctggctg cagtgcagtc agcgtgcatg tcccgccagg acccccgtgc 240
 tgccctgtga ccccgcccc atgctgaggg agccacacag tgtccatgtg accctaacac 300
 atgcctcccc gccggccctc ttttttttgg ttagcaacac actcacttgt aaaaaaatt 360
 tctagatggg gtatggcacc acaaattaaa agagactcct ttgaaattta ctcacctctt 420
 tgagcttagt agatttggtg aatgaggatc tgtatggctc atgagtttac agatggccaa 480
 actcttgag cactttacc tcttactggc tgcctgactt tctgaacctg gtgagctgac 540
 taaaggtcag aagctgcacc ctaatgaaag actggacttt agtttgtgtg ggtatcatca 600
 ttaatacttc attggacttt tctatttcct tggaaatgaat tccagaaatt atattatgat 660
 gcagaaaaat aatcccaaact ttgagtaatc ctatcccact 700

<210> 100

<211> 637

<212> DNA

<213> Homo sapiens

<400> 100
 gggtcaggtc ttctccatta actaatacca actgtggaca cttttctttt gcatctctga 60
 cattcataag tttcttaact ccaagtttcc tagcttcata gttgcaggta accaccaaact 120
 atttctgttg aacccccgta aaaaatattt tatgagaaac ccaagcacia ttgaagaaaa 180
 catttaaaga tattattaat tccgtattac atttgtctaa attgtaagac aatcagtttt 240
 gataagaatc aaaagccctg tctcaattaa aaaacatagc ctccatatat caaatctcta 300
 taatgcagaa acattagggt ttcaagctat ctcttaatta tgaattataa tataccaatg 360
 tattattttt ccatacccca cttttaatct ctagttgttt tgtctccttg aagaaggaaa 420
 gttattatta aataacaaaa cactgaataa cacagaatta aaagttagac gatagatcaa 480
 ttattcatat acaaaaggca atctatgtat tacatttcta aaatttaaaa atgaacctaa 540
 atcaatatat tctatggaat cttcagtgat aagatacaaa tcaaattctct ctaggatttt 600
 tttccagaca atataaaagc agattaattt atactgc 637

<210> 101

<211> 663

<212> DNA

<213> Homo sapiens

<400> 101

```
gggtgtttct ttagtgacag tgcgggatca tcatcaggta ttctgggaaa ggaggggatt    60
tttaggtaac ccccaacaca gcctcgttgt ctcttactcg ggttttcccg ggagaacaga    120
ggacacatca cgctgggtggg ttgccttct ctctccctcg ctttggggtt tctgccgccc    180
tgtggttact ttgccacgtt cctgtcttcg ctggtgcctg ggttttccgt cctcctgtga    240
ccaccagtg ctattcttgt ctacactgg gtaagcagaa attccagcgt ccagcgacat    300
gcagccatgg caagagctcc gggcaggaga ggcggcgtgt gctgctggag taacctctgg    360
ccagccacct gggaagacct ttgccatcgt ctgccatcga cctgccatgt ggggaacccc    420
gagcccagca gctgcccgca cagaagatca gggcagccct cccggctcca gggtagca    480
gggtgctgca aagactgctc acaacagcag cctgggacaa gccaaacgtc tgttaatact    540
gaataaatcg tgggtacata aaccgcagta tatccagaca acagaacgct gtatagcaac    600
tgaagcaaat ctacagaca cgaagtgaag aagacaaatc agaaaagaac gcacttaaga    660
aag                                                                    663
```

<210> 102

<211> 598

<212> DNA

<213> Homo sapiens

<400> 102

```
gggttacagc agggaacctt aaacctagac ttgggacccc aagtcctcgc ttcacaaaaa    60
tcatgacatg ggtgttgaac cagtttctgt tcagccacac agaaactcat tcaagtcctt    120
caagaggaag aatcccacct tcaactccac acctcctcca gcaccaggcg gagatgctcc    180
tgattccact gagaatcctc ctgccacac aagcaggaaa ctgggggcac tcagtgcctg    240
ctctctcacc cactgcatgc ccacagacct ctgcaaaggc agctccttta ttcccccaat    300
cctgaacatc tgttaagtgc taaggcctca gagggggcctt tttaaacagg cacaagtag    360
aaactaccag ctttccacca ctctacctc atccatcaga aaacagagcc accagccttc    420
```


cagggtaggg ttcataagc cttttcctcc ccatggaact aagctgtaca cagtagtcag 480
agataaataa tgtctaagcc aaaccggctt gagggcacat atggaggtgg ggggcagagg 540
gacactggcc tgggacctaa accaccattc agacctcatc tttacaaaat agtatact 598

<210> 103

<211> 401

<212> DNA

<213> Homo sapiens

<400> 103

ggggggactt aagagtaatc aaaagaaact tcatggcaaa ggtgagagct ggacaatatt 60
tgggtagaat gtttttggtta aaaatgtttt ttggtatcaa cctatacaca ataacaacaac 120
tccaaactcc atttcttttc agagataact attttataag tgaacctttt acttgattga 180
aatagtagat ttgatctaag tacagcatgc tgtccagaga ctatgtccaa catgtctgag 240
caaacattt acaacttaag ccaatagtaa tgcatactgc ttttatagca gaatttccac 300
agctctcagc ttctaggggtt ttatttggtg tacctttctc taaattctat tgaaaagcag 360
aagaatatag tggttacaat atatagagaa gcaagggtgt t 401

<210> 104

<211> 640

<212> DNA

<213> Homo sapiens

<400> 104

gggggagcaa ggatacaacc agttggcggt tttcaacatt tcctgtccag tacagtgaca 60
gtattctttt atggaacatt aaaggcagtc tccttcatac atattatttt tttttaaaac 120
aagtgttttt gttaattggc tcatgactaa cggtcattct acaagacagt gataaattag 180
ctattggatt attacctgtt agtcgtggga ggaatttttag tatttatgtt tttatttttt 240
gttgatagtg cctaaaatta aaaacatcct tcaattcctt cattttatga ttgattttat 300
ccttcactac cttaaataac caactgggtg tatccttgct tccccttcgt tccgctctgc 360
atcctccttc ttcccccttg ttgcgattac caccattctg tagtctgaca agactttgtt 420
ttttccatta accttgaaaa tgttattttt tataaatctt gtatccacct tctaaagtcc 480

attcattctg cacagtttgg taattagaat gagaatgtgg caagtgtgca caaggcatct 540
 gcttttttag aataaaaaat aatattcttg actttagaat agaaagggtt tcagaaatct 600
 agttcaagcc tcttatttga aataatgcca agcaaagtgc 640

<210> 105

<211> 567

<212> DNA

<213> Homo sapiens

<400> 105

gggtaggtaa caatgggagg agtggggggc taaggtagac cagaaggata tgcttgggga 60
 gaaatggcaa cagataacca ggtccagcca ttgtcactat gcataatcaa gggcctgtgt 120
 tgccaatttc tcaggggaaa ccagagatca gggttttcat gtgaaacctc gtgatttcta 180
 aaaatattag caactcattt taaaatgcac tgggctaaca gtctacaaat tctgggtgtg 240
 gcatactatg cacaaagggt tccatactta agaaattcag gacacactga gttgaacaca 300
 gtgcaacagg cttctccctg cagacottgt cagagccttt ggaactcaa agtatctgtg 360
 gttctccgag aagggggcgc tatagttggc agcctctctc aattcactgg accacaggac 420
 tctggtttgt ggaattcctg ctctgatgt cttagcaggc agggctggga gctgctctct 480
 gctgcccgtc cccaagggtg agcatctgac tataagcaaa gcccctggg ctctgggttc 540
 tagagggcca ttccctctg cacacaa 567

<210> 106

<211> 461

<212> DNA

<213> Homo sapiens

<400> 106

gggtgccgcc catcgtcacc cgagacagtc cagttccctg tccccccca gcactgcccc 60
 cctgtgcccg ggagtgccag tctcttccac agaaggagga cgcaaggcca cccagctctc 120
 caccaatgcc tgtcattgac aatgtcttca gcctggcccc ctaccgtgac tatctggatg 180
 tgccggcacc cgaggccaca actgagcctg actctgccac agctgagcct gactcagccc 240
 cagccaccag tgaaggtcag gacaaaggct gcagggggac cctgcctgcc caggagggcc 300
 cctcaggag taaacccta aggggctcac ttaaggagga ggtagccctg gatttgagtg 360

tgaggaagcc cacagcagag gcctcccctg tcaaggcttc ccgttctgtg gagcatgcc 420
 agcctctgca gccaaagagaa ataaaatact ggcttccgga t 461

<210> 107

<211> 519

<212> DNA

<213> Homo sapiens

<400> 107

gggaagcagg gcgactcttt ccaggaaggc agtacttact tctctgttct agaaaatgcc 60
 cagcattccc ctctgttttg gacacaccac acttgcacct atgagtagcc tgggcttcaa 120
 agaattattga ccctagggag gacaatgaag gatgcaactg attgggctgt tcattctcag 180
 attttgccta cacaggctgg aggtggactc cagtcctctt agattccctt ctagttccaa 240
 tggcagctat ctgaaaagaa ctctaaacct cagttgcatg taaagacacc tgttggactt 300
 cagtgagcct gtgaacaaaa gctacgtaga cttatgagga atggcttcca cgtccacact 360
 tgacaaatgt cttacgtggg gtgaagaatt aaacaaagat aacaaaggat aattccctgt 420
 tctctgaatg cacttgattg gctctttctt tcaagaccag atctgaattt ttaaagaatg 480
 gtttcagcga catttgctcg tagcaaccat tcaaaaatc 519

<210> 108

<211> 578

<212> DNA

<213> Homo sapiens

<400> 108

catgtctctg aagcatctca ccaagaagct gctaaaccgg gatatccagg tagcatctcc 60
 ccacatcccc cgcccccatc ttggacatgg ctctcgttga tgcccctagc cagactctga 120
 tctcagaagt cctgtggttg tagagatcca ggtgggctgc tgtgatggga agagctccat 180
 ctgtacacag gataataatt cctgttgtct acctcataga atgtttcaaa gtgtgctttg 240
 gaaaagggaa aaagtcctaa gtagatataa aaccctaact aaggaagaaa gcaggtagca 300
 gtggtgggcc aagagaccgt gtagtggatg caaggaccgc tcgtatttta cacgctatat 360
 ttcagcaaag ggtggcccat ctggcaggaa gatggggaca tatgtcacat atagagcagt 420

taaggaacta gggaaagtgg aagactcaga agacctgtct ttgacctggg atgttctatc	480
tctacagaac ctaatatggc ttatacatat tgccacagaa aggactgagg tagacagtgg	540
caaaggcttc ctaggagttg aaccctgaa attacata	578

<210> 109

<211> 587

<212> DNA

<213> Homo sapiens

<400> 109	
gggttcctta ctgctttaat aaaatgggaa taacagatgc cacttaactg tcaccacagt	60
gtttgcaaact caccctact gtatactgtc atctgatttc atccttttca tcctgacttg	120
gataaggcta acgagcaaaa gagctgtggg ttttctttgt actgccatct tcttgagcta	180
ttaggtaatg ctgacatact gctagaatat aaaaaatttg ctggagtatc aaaatcatgt	240
attccttagt gtggcattta atatttttta attatgcaga attgaagtat aaaaaaaga	300
gaaaaaaatc ttcctagaaa aattgtaaaa gatgaaagcc caaaaaactg caaaaccctc	360
cctaaacaaa aaccaaatac ataaccaaag gtaatatattt aatgtgcatt cttgtgggtt	420
tatagctatg taaatataca tagttataga tcagtatatg tgtgtacaga taaggaatgc	480
aggaaagcta atattgattt ttttatgcaa caatcacagt attaagtaat ttacatccat	540
tttttttttc ttttaattca taccaaacc ttatgaacca gggtttg	587

<210> 110

<211> 563

<212> DNA

<213> Homo sapiens

<400> 110	
cactagagct tgagatgagg ggtagacata ggtgggtggg gttgccaggc ctgagctggc	60
agagatagag agatactcct tagagatgat gagaagaaag tgcaggctgg gggttttgag	120
aaaatctgca gtaatatggg actctaaaag actctactac cctgtgcaag accccctcc	180
tctatgagct ttctgttca tgctaactct gagaacttcc cattccacag gtttctgcag	240
ctctaattgtg ggtcctacag tcacatccta ccttatattta caggtagtta ttgcataact	300
gctatttgca aatatatgtc agattgaaat aatgacaat acttacatgc aaagatgctc	360

agggcaatat tatttataat cacgaaaaat tgtaaacaaa atatccagta gaagattaaa 420
ctgtgcagac ctccctaaaca atagtttata acatataaaa tgttcacatg ctgtcaagtg 480
gaaaaagtaa acaacaattc tatttgcattg ttttgtaaaa accaaaaaca aaagattgga 540
agaaaacata ttgaaaagtt aga 563

<210> 111

<211> 503

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 111

gggatagtaa tttccatctc tgagtttgat gtttttaatc tgtaaaataa gggcgatgga 60
ctagatgagg atttccatgt cttttctact tctaaatata agaccgcttt aaaaatagca 120
gttttctatg ttttttccag cccagcacac tggcagggac tctaatgcca ctgaagtctg 180
tgtcagaaac tctgttaggg cagagtgagt atgcaattga atgtgcacat ccttaatacc 240
ttataccagc aactctgctc ctccattctc tatacccact ggaaaatcac caggctcctt 300
gatctctaata tgaaagatgc cactcattac agcagacaca gcaggcagca ggggccnnnn 360
nnnnnnnnnn nnnnnccttc atctccaatc gaaagatgcc actcattaca gcagacacag 420
aaggcagcag gggcctagga caggcagaag gaggaaggag cagtgaagcaa ccagcctccc 480
atctaggaag aactgtggaa cac 503

<210> 112

<211> 645

<212> DNA

<213> Homo sapiens

<400> 112

gggatggtga aaatggcaaa ataaaacaga ggaagataga atcattatca atgtaattat 60
attatgtag atggtccagg ttacattcag ataattaata tccaagttct gaggttatag 120
agaaagcata tttagcaag aaaataggaa caacaacaaa gagtcacatg tatgtggttg 180
tgttacatca ttttctctaa gtattcagta tgaaaaagcc atgacataaa aatactgttc 240
aatctttaga agtacatfff taaaaattat cttaaaacac catattattc tctctaaaaa 300
agcagaaagg tttcttctgc ttgaaatact cagatattat aaaaatgttt aagaaattca 360
tgaccactga tagttgatgt ttaggtttcc atagtttttag atgctagaaa aaaataattc 420
catttacttc aagtaaactc cagtattcaa aacactagac aaaatatgaa taattattgc 480
ataattaaga aaatgtgcta atgcagtatc taaggaaaag gaaaaaatt tctaaatagc 540
aagaaacttc accactgttc tcttctgac tctcctctgt catgctaagg ctgctgaatt 600
tggtctacaa attctctcca agcaaaaccc tctcatcact cctgt 645

<210> 113

<211> 605

<212> DNA

<213> Homo sapiens

<400> 113

gggaacaaag aaaaattaat agacggaatg gaggcaaagg tgaggctgaa tgtgagatac 60
ctacctataa atatgaatgc aaccctaac aaattcgtag gcagactgaa aatcatgtgg 120
gcgaactggt tcttgaaaac tatttgtaaa actcctctag tgggcccacaa gagttaatac 180
actcccctaa acctcttctc ttctcattaa gttgaactct ggaaagtttg ggtgaatttt 240
cacatcatac attctcaacc acaactagaa atccagaagg cgtgtcaaca aaatctgtcc 300
ctggaagatc tgccctgaaa tctactctct ggagcaccct gccacgaccc agttttgtga 360
catcaatgcc ggggcataatc tgggtgttaa ctgctctgga aaactccgg gtgagaaatt 420
caggccatcc aattaggaca ctccagggtt acctctagct taaacactct gactggtttt 480
atcttattag tcttcatcac atccctgttc taggctaagc tttccctcag ccctgctgct 540
gcttttagaga agcaatggac agatgttgca tagaataaaa aaaattctta atttccagcc 600
atcga 605

<210> 114

<211> 446

<212> DNA

<213> Homo sapiens

<400> 114

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gggagttcct tgaccacaat atcaatgtta ataattgggt taaagtacag ggcccagtaa      60
aacaaacagt tgcaaacaaa ctgaggggatg agggggccaga acatgaccac aaaaagcccc      120
tgcgttgata ctttccagaa atgggtccac atcctctgag gcacggtcct aaaacaagaa      180
gagaagaggc tgaatcggag gcgcttctca tgaccacacc caggagtccg ggccctgggc      240
cttttctggg tgctgggaag agcatggctg cccgtgctga atgtccttgt cttctgtccc      300
cggtgccctga gacctctgcc tactcaaccc atcttttaac tctcaaggac atgacctaca      360
gggagcttct ttgccccac actgggcaag gcctccctgt gacagcctca acttcacctg      420
cttcatcact ttgttacatt tacata                                          446

```

<210> 115

<211> 493

<212> DNA

<213> Homo sapiens

<400> 115

```

tagtgccctga ctaaatttgg agataaggca gacctcagga tgaatcacag gtttgaagcc      60
taagtgactg gaagaataac ttctactgaa agaaatgcaa agtccagaag taaaattagt      120
ggaaaggaat gattctaatt ttacttgag tgggtccaaca caatcacagg atagtcaaat      180
cgatgcctta gtgttataaa caatatgaca caaaggacta atagaacaat taaaacaata      240
tagatataag aattaaggct gggattcccc ttttaccgcc ctctagtcaa atccaattaa      300
ctttttttca atgatcatgt taatgaccat ttatctttga taactttctt tacctttggt      360
tcccataaca tcacaatata gcttctacct ctgttcacca ccacacctag ctccctcggtc      420
taagtaaact tagtattctt cagtgatctg caaatcctg agtttctaata tatatttctc      480
taatttgaat tat                                          493

```

<210> 116

<211> 610

<212> DNA

<213> Homo sapiens

<400> 116

ggggtacacc aggcctttgc gttggacgtt ccacaaaggt agggactgac gtttattctc 60
gagtcagtga tgttctggag caaaacctaa aaagaaacaa aaacctaccc tctattgtat 120
ttgcaactgt ttctgctttg cattgtcatg tgtggtttga cctgcctttt ggatgttttc 180
ctctcctgaa acatcgccca gtccctgggt taacctggaa ggcgaggggg aaggaaggca 240
acctccctgc taagggtcca ggcagtgggt ttggtgttgg aagtggcact tgacgatttt 300
atgaaaagtt tacaagtcct tcctagaaaa gatgtaatta ggaaaaataa aatacagaag 360
aacgttgagt atgacgcgtt tatttttaaag ggtagtcctg tctcaaagtgt gctgcacatt 420
tttgtggaaa gccaccaagc tgggtaacta atgcaaacaa caaaagttgt tcatcactgg 480
atcaccggcc cttaaagcga ttccagccct taatagaaca cacacctgta gggcaaatat 540
ggagatttgt ggtgtagtgc tgccaccctc gctccccaac tctcaagcat tttgccctt 600
tacctcagag 610

<210> 117

<211> 538

<212> DNA

<213> Homo sapiens

<400> 117

gggatattag cagacaaaga agagtaggga aaccccagct tggggttggc attcaaggct 60
tcagaagctt ggctgttctg aatcagagaa atgaattttt gtgaactgac cattccttgt 120
tctactaaaa aagctagcat cttttacatg ggaaacacca ggtctcttgg cctggcacta 180
gatcctcccc ttgatctggc cctacctgca ctcttctag tatctatgtt cccttcacat 240
caagccttct agtatctatg ttcgcttcac atcaaaccat ttgctgttct ctgttcccat 300
cctccacttt cccagcccct gcctttgctc ctgatgtagc ctctgcccgt gcttccccta 360
ctcttctttg tctgctaata tcctgccac ttctccata aagccatctc tgactgttcc 420
cttcttctaa ggggtgaaaa ttgttttctc tcctctaaca tctgtttctg tccggggctt 480
gttctaccct aaatatcagg gtatttttta tagttatggt aactgacctt cactaatt 538

<210> 118

<211> 500

<212> DNA

<213> Homo sapiens

<400> 118

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gggggttaaaa aaatctgagc tatcatataa caagaacgca aaatcaggag gactgatcaa      60
gtttaaaata ttttaagtct attgggtagg ggaataaaac taatgactaa ctttagacta      120
agtgaaatat tcatgttaaa tttctagagg aaccactacc aggtggaaac agaataattgt      180
atttctgcag ttataaagaa tgaagtggga aaaatctaaa gaaaacatag acagcttctg      240
ttattcacat taaatgtgct ttcgtacct tagaaaacat actgtgtgtg tgcattgttc      300
aattttgggt aaaacagcaa agtaattgat agatacaaca tttctttctc tttcatggca      360
catgaaacac aatctgacct tccctttagt ccaagtttaa tgctcaacag tgttggactt      420
ttctaggaca aattgtggca ttttatgtat ctacgaaact actgacattt aaatgtcttt      480
aaattagata taacattgaa                                         500
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<210> 119

<211> 739

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..():

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 119

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ggggggaata agtgaagtgg ctgaaattag agttgcgttt gaggcaggct gcaagccttc      60
tgctgccttg agcaaggctc cgtcctcgcc tgcttcatta ttctagaaag agcttggctc      120
ctggtggcat cgctatTTTT ataccctggt ccaaaggagc catgaagtgg aaaaagtgat      180
```

```

tttttaaaaa atctacactt aaataaacca aaagaaatgg cctgtggctg acattttgag 240
atttacagaa ctccagcaaa aagctaagga ctgggggata ccaactcacc atccaattcc 300
taatcaaagt tgcacaaact aaatatgtaa gcacattttac tgctcaaagt tctcagtaaa 360
ggtgctttta ctgcagtttt tcctccacta aaaactgctg acaagtaatt gggacatttt 420
tgtcttgccc tgagaaagct agactgtcta gttaaaagat aataggaaac tcattctaaa 480
gtgtcatctt attctattgt ccacagggct gtccgatttg ttaatcttca cttagctgag 540
cctgtgaaag gtggattcca ccgtaggttc atctttgtgc tgtagtggtg tgaagagggt 600
tgaacaagga attaaaagcc nnnnnnnnnn nnnnnnnaag gtcttctaga gggcatatcg 660
agctttattg acgattttat ttccacttga tacatgactg ccagcaaact gtttctctta 720
ccttactatt tcgtcatct 739

```

<210> 120

<211> 570

<212> DNA

<213> Homo sapiens

<400> 120

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gggtgggtgt tagtcgagac cggggggcgc ggggcgtgcc ccttggtcgg cgtcgcagcc 60
cgatgggctg gctggttgct acctccgggc gaccaggggc ctggggactt cgtgcctggg 120
ccagggctct tttcctttcg cgggcacagt gaggagactg cgaggtgagg tgcgtccggg 180
tggatcccgg gctgcggcga ctgtcacatt ctccccggcc agaccggagg tggagcagaa 240
ctgggggcga cgagcttgac tgggattgca gctggacgta tttaggttca aaacatcctc 300
ctcctggctt tcttccgctc cactctttgg tcaggaagac tggggcgggg taccceccaa 360
cccatgccct caaattgctg gcctagaggg cacagcgctt ttctaaaagc tgcagttggg 420
ttgcctctaa aataatgaag ctaacccttg ctaattgtgg ggaaaagata gccagaagca 480
gcaaatttct gctgtggacg tccgatataa actgatcctc ttgagatggt taatgcttag 540
ttggctatac ctgccccccg cccccgccgc 570

```

<210> 121

<211> 488

<212> DNA

<213> Homo sapiens

<400> 121

gggaggtggg gaatagggag gagaattgcc cttatcaagc aaattaacta catttttagg 60
aagaggatag aacaaaagac aagcagttac ctattcaaac tcttcaaagt agtatgaaac 120
cctgtttttac aaactgatct gcaagcaata tagaagggtg tagccatctg gacatcatag 180
ccctaagttt tatttaattt ctaagaaaaa aaactacata aatttccttt cagtagaaat 240
tattagttaa aattacaaga tactgcaaag gaaacacata agtctgaaac agcataataa 300
gcaccatttg ctctgaggac aggttctcat cattttctcc caagaggaa aattttccaa 360
agtatttgaa aacgttcaca gagaactttc ataataccca acaataaata acacatagtt 420
tcagaaaata tcaaaatacc tgtgttatat aatcaaata atttcaaacc cattttttaa 480
tatttcct 488

<210> 122

<211> 503

<212> DNA

<213> Homo sapiens

<400> 122

gggggtggtt aaagatgcag taatggcaac agctgaacct tcaagagaaa aaaattggct 60
aaggacagga aaaaatatct cttcttctta gttatatata tttctattta aaggggaagc 120
caacagagct gggggaaagg aaggaggga tgtgtacact gaagtaactg gcgttggtaa 180
tatatttaca caggacccca gttttaaaaa aaaggggtggg ggtgaacaaa taccttcatt 240
taccttatag ttacttacc tgggtccttg aggcataagt gaaatagcta ttctgtagtg 300
tgagctctct gccccaagca aaaggcaacc tcccttcaaa gtctgacagg ttttttcagt 360
caattgtatc aggttgaatt acatgacact gacatttttg tatgtcaaag gcagaatatt 420
ggcaatttca tgtggtccta aagcaacaat cccccctcaa gtgattacaa tggtagacct 480
taaggctttc tgtttttcta ggg 503

<210> 123

<211> 405

<212> DNA

<213> Homo sapiens

<400> 123

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ggggtttggg ggctgcagac ccgggagcta cagacccaga aggtgaaggt aactgcaggt    60
cacacctgca tggaggagct gtccgtgggc cttctgagaa ggaggaagta gacgcttaga    120
caaagagtac gcggcgcaag ctctagaact tgggctcagt gaggctgtcc agtgagggtcc    180
agtcagagta atgtgggcag ggcagggata tgggggctct gaaccccagg atttgtgagg    240
ttttggttga caggcagagg tggggagaca tggagggtgga aactgatcat ggggacaggc    300
attaaggcag agggcggagc tacaacctga agtatcgga cttcctggcc aacagacgga    360
ccaagccctt gtcaatagga aaaacaaaga tttcaggtct acagt                    405
```

<210> 124

<211> 423

<212> DNA

<213> Homo sapiens

<400> 124

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gggagagggga aatggctgga atattcgtca atctgtggtg ctttactgga gatttgcagg    60
agttcagagg aagggggcat tgaatttcat aacctaaacc gtatcgtggt ttaccagaaa    120
gttttgaccc gtgattccgg ttttaaaggc tgagtagggc cgggcgcggt ggttcacctc    180
ctctagtatg cttacaaaat gagagtcctg gaatagcaga catgcattgt aaataaatga    240
acatctttct acaagtatat ttccccaagg ttcaactgaa tatagtttgc tataatttct    300
taaaattcaa tcaatttcac atccattaaa cttacaagta ccgtaatcca gttttcctag    360
gaaaactaag ccagccgaa ccttgggaaa aatacctctg tgttaaacad atatacatga    420
tcg                                         423
```

<210> 125

<211> 511

<212> DNA

<213> Homo sapiens

<400> 125

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gggaaatatc cgtgcctgtg gcagatctca ctcatcatgc ttagcattct ctcccgcaa    60
```


gctgggataa gcctcatgtc ctaacacagc acaacaggag gtctctgtca gtccatcaga 120
gatgacattc tatgtgatat ttttgacatc cttgtgctaa aagcaatggc acaaaatgga 180
aaagggccta ttgaccacac ctactccagt aaaaatgttc ttcattttatt ccttaatttt 240
ctaaatctga cccctttaaa gcaatctagc aaattgagaa tcctcagctc tccttgata 300
cctgatattt tatttcaaga aagagacaaa gaaggaaaat tttattttatt ttactacca 360
catataaacc gaaggagat gggactaccc aaacatttgc tgctcaattt tgtgtcttgt 420
gcttgaaagt ctgccctaat gcataacaaa aactacttgt ctctacctt ttgggatccc 480
tttaacaagt atttgccttc tgaactacgt g 511

<210> 126

<211> 457

<212> DNA

<213> Homo sapiens

<400> 126

ggggaaggga gaagtcaggg aagggaact tctgaatgga taaagatgag cttaaaggaa 60
agggcagctt aatcaaatga cagtcacctt ggactgtgat ctgctcacag gtacagaagg 120
gacatactta atttaagggtt caaatcccaa taggaacctc agtgaagggg tgctgcagtt 180
acattggctt ggcttgctta gatagagaag cctcagtggg gtatataccta cccagaaaa 240
gattgtcttt tttttttttt tctcagcaac ttccaataac agtgaaagt gagccacctt 300
gggccagagt tgagggtat ttcagaagct cctgtacagg aagattgctt gggtttgatg 360
gtccctaaac aagattccca gtagttggga aagatgggga ggcaactgtg gcaagtctgt 420
ggaaattcgg gccctcacgt ctcttttaga aagaagc 457

<210> 127

<211> 482

<212> DNA

<213> Homo sapiens

<400> 127

gggcttctag aaccattaaa aaaaaaaaaac ctctggccgg gcatgggtggc tcacgtcttc 60
ttttatctgc atctcctact tcaataactg atattacctg atctggaacc tggagagtca 120
tccttgaatt cttctccccg caaacagat tcctcctcct taatgtgcct tgaacctgtc 180

ttctccccac ttctcccttc taaatagcct tagaccaagc ctcacatctc tctcccagac 240
cactggcttc ctcacaaatg tccttgccct cccctagcct cacctctcca atggattgcc 300
catatcacag ccagaggatt tatttctaaa aagacatcta tctggaagac ataatcagat 360
catcctgctg tatacagaac tttccaaggc tttctgtgcc caacagagaa agtccaaatg 420
taataaactg ggatgcaaca ccctcaattc tttttttttt tttttttgag atggagtctc 480
at 482

<210> 128

<211> 733

<212> DNA

<213> Homo sapiens

<400> 128
gggtgcctga catgtttgtg gccttggcat gtagtttcat tattcaccac tctcagtggc 60
ccaaggtaaa ctccactttg ttctagacct atttgaaaga tgagctccag gaataaaatt 120
tacttaagcc ccctttttct tttgggaggc gaacctggaa gtgggaagaa gagatatagg 180
agctcaactg gaaggatgaa tttctgacag tataatttat tatgtatgat tagcagataa 240
ttaggacttg tgcaaatggg agttggcagc taagcctagt atagatccac atcatggtaa 300
aagttacatt ttaaccatca gtcaaacttt taaaaggact tctagcaatt caagctagct 360
gttttgtgat ttaaaatggt tacctgcccc acaaagacca ctgaatgac acagggtatt 420
ttctagttaa ttacagggt tgtaattttt gcttattggc tcttgattc attgcctgct 480
tcttgcccac ctaatatattg ttgatgaatg aataaatggt agatgtatct gccgaagatg 540
gaatgttttc caccatgtta attttacttt aattagaagt ttactgtgg gacttagaat 600
ttaaaaaaaaa atcaatagat ttgagatca tgtaagaaga aatgtttggt ttagatttca 660
agcactatgg ttttgtcatt tttgatgaaa gtgtttcaca tattttatct acataactat 720
ttggagtgg aag 733

<210> 129

<211> 546

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 129

gggaggcagc agaaaaccca tgttgagtgg tcaagacatt tcacaagcaa ggaaagggaa	60
acagtcaagc tataagaaag tgtttatgac catgggcggt cataaatgaa gatcctccag	120
cttttggaca ccgcagctta tctcttagtc tctggtttgt ttctcttaga atgattatga	180
ctagaaaatt aaaggctaatt ttgtgaacaa aaatcaggat ggttttttaga ggtactcaga	240
tgatatatgg agcattgtat actcaggttt atagcttcat cagcttattt tattaacttt	300
tcacatcctg cttgggtcatt tcccctgttg tcttgagtat accactatta aataatagga	360
cacaaactac attaaccagt attttaatgc tttttaaaat gtattttaata ggaaatttgt	420
ccnnnnnnnn nnnnnnnnnn nnnnnggctt tgcaaaatgg atatattttc caaattatga	480
gagtatttat atatgcaata tttatcaagg gctataaaaa acatcatttt tttcatccat	540
tatttc	546

<210> 130

<211> 622

<212> DNA

<213> Homo sapiens

<400> 130

gggctgcac actgttaatt caccctggta ttaacgagga atgaacactc tctgggtgat	60
aatcttaaaa ccagttatta atatacttta cactaaaatt aaaaagacaa aaaaacaaac	120
tttcctaata agatggacac aggacaaaat aaaaagacta aaggacatca cgacggtgaa	180
ctaaatgatt ttgtttgtgg cctgccatac tatctggaaa agaatttaat tttcctgcca	240
tgatttgctc ttcaaaaata cacatctgcc atctgatatt taatgatctc ttgattaaaa	300
tgtcatggct tgaacattca aaggggacct ccagttaaac aaggcagatc aaacacctct	360

gctctacctg aaactcctct aaaataaccg taaaaggagc agggagatta aatcgtaaga 420
 actaagaaga taggagaaac aacattgtga agctagaaaa catgtctctg ccaacagcga 480
 aaggccaaaa gcaaacagct tcaaactgaa caacctcaga aatgttcagg acgggggacc 540
 tccaatgttg gtttaagaga ggaaacagag tgcaccggaa acgggaaaat gagtttaaga 600
 tgccacactg aaaaggggag ac 622

<210> 131

<211> 671

<212> DNA

<213> Homo sapiens

<400> 131

ggggaggaag gaaaagagat ttcacgagat cagatgacag acttgaatca tggaagacac 60
 atagtcaatt gttttgttct ggtgcattag ttgggggaaag aagaactgag tataagggaa 120
 gtgaaccaca acaattctga gtccttttct tgaaaaaact aaacataaca aaagtgcctt 180
 taaagggcat tttcattcct atctaaagta tggataatct ggcactcctg cagtccatgc 240
 ttttcaagta agcaaccaac caatcttata gtaaagtcog taacatgtac ttagaacaat 300
 gccaagcaca gcagagagaa aaactataaa caagaccctg tgcactcaat tagtttataa 360
 tttagttggg aagcgcaaca gatcattcaa gaataaccta agagagttga gtgcacaatg 420
 aacatgaaac tatgtggtat gacctggatt agaagtacgt gtacgtatga agctctagag 480
 ctttcaatga ttttcttttc tgcatagcta caagagaagt cacagaatth ttaaggctga 540
 attgaaactt taaagatgaa caaggttctt catgaaaaaa aatctcattt ctttatttta 600
 aagtaaggca taacatatca aatttataga gcccttaaat atattgcaac tgaagactaa 660
 aaattctcca g 671

<210> 132

<211> 564

<212> DNA

<213> Homo sapiens

<400> 132

gggctgggag gggacgtcca gtccctgccg atctgggaat actggggacc ccaataatcc 60
 agggagacct gaaggggggt gtcgggcaga gggatgggga ccaggacaac ggctgggcat 120

gagtcacttc ctgggcctaa gggaaggaat gactcaccac tcatttgccc caattcaacc 180
 ctggaggggc ttccagggga attttgggggt ctgttatgag cacagcttca gagggcgggt 240
 gtttgggggtg cagattggag gtccccggac cactcagcca ctgtgttcaa atttagtacc 300
 ccttaggtgg gtggaaggca gagatcccca ctccacctc cactctctt ccagctgggt 360
 taaaccaagg ccgaaacccc ccagcccaag cccgtactcc ccacttctgt caggattccc 420
 ctcttctctc tctctggcca caaggcttgg ctagttctc cctcgccag aaccagttc 480
 ctctttgcag aacagaccac aaaatgacct cccctggcag gacaggatct aggcagattc 540
 atctctaact cccaaagccc cagg 564

<210> 133

<211> 636

<212> DNA

<213> Homo sapiens

<400> 133

gggcatggtt tctatggcat tctccagagg actaattgtg gtctgttgaa aatgagatca 60
 ccaagaagaa agggccttag ttaagtcact ttaaaaacag atattattgg tattgatttc 120
 acttgggggtg ggaattcaaa tgaggcaatg ctccctaagg ggctgtaaca ggatcttgta 180
 attactgagc tctgggggct gtctgctctc tggggagaga caggctggct ttctgcttag 240
 tgagaaaggg atttctttgg ggaggcagaa gcaggaagtg tcaggtaacct gctgagtgtg 300
 cccagagaa ggttttctct tcttattatc tgggtgaaac acatgccaat tcaacccttt 360
 cagtattggt tgggcagata ctatgtgtga gttattggcc agagagatta gagcagcttg 420
 cgatgtgggc acccagcctg gcacatagta ggtcctaaga ctggttgta gaggggttca 480
 ctgttccaag gtagattcac tttagttggg aaaattaaac agaacacctg tccaacacct 540
 cttagaaggc gatataaaca gagtgccatc aaaagctaac cggcaaaaag tgcagtttgc 600
 aagagcatga gatctggagt agaaacctaa agtaga 636

<210> 134

<211> 603

<212> DNA

<213> Homo sapiens

<400> 134
 gttaaagtct tcctgttaaa aacagaggaa gcatgaactt ctcctgaggt accatttttc 60
 acccaacaga ttggcaaaaa cgggaaagct gttaacgcta tggccacggt catctcccat 120
 ggggtgagtg gaaggggctg ctggtgtgac ttcagggggg tcaactggcaa agctgtcaaa 180
 atgtgaaggg tacacaccct ccaaccatct agaatgttcc accctaggcc accttctgag 240
 tggatggtag aaggatattt actgaagtcc tgcttgggca aggcaggccg gatttggggt 300
 cgaggggtgt ggggcgtgca cgtagccctg ctgtgcagct gtgggaaagg gtgggcagta 360
 ctgtggggct gacaggagcc atccctggtg tgtgctgttg ggtgacaaaa acagggcaca 420
 agagcaggct gccctgccc agacacacat ctgctctctg gaaaccagge ccctgggagg 480
 gcagccgcga tgccctggcc caggataact aggctggtct gctcccgctg ccagccatgt 540
 ccagtagctg gtaattggtc aacactgccc taacttcctt cgattttttt tttctttttt 600
 ttc 603

<210> 135

<211> 583

<212> DNA

<213> Homo sapiens

<400> 135
 agaggtacag taaaaaggat caagagtgtg ggtggcaggg gatagcagtg cttcacttta 60
 aaatagtcaa gagtgggcct cacaatttta tttctccaac tcggaaattt cctgtgagct 120
 ccagacatgc atattcaaca gctcatcaaa ttcaagcagg tccaaaggga atgcataaat 180
 gcctttgcca tctctctatc ccaaacaat acaataaaca ataacaacca tcctagttca 240
 ataaagagaa ataacctcca agaacactgt aaaagccaga ccttgaagct attttagtat 300
 cttacacgct ctcatcttc cccatatcca attcaaagtc ctgtcaattt aacatcctaa 360
 atatttctgg catttgatc ctgtctctat caatagccat caccactgcc accactacta 420
 cccaaatgca ggctaccatc acctttattt gatcagtcctt tattcaactt gccttctcac 480
 ttcccttctc acaatcattc ttacagagc caacaagaat gagattttcc aaacataccc 540
 ttcaacttgc ttaaaacact tcatatgctt tcaactgctct tac 583

<210> 136

<211> 480

<212> DNA

<213> Homo sapiens

<400> 136

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gggaggaaga ttcagtgata ctgacctatc tattccggaa ctgtgtctgt gagctcaggt      60
tgtccatagc ctgctgcaat atgtctaaag attgatcact ataagttttc tcaggttctt    120
ttttcccctt gtcggtctta tatttcatag tccttttagcc ctcaaggggc tagaaggcag    180
tttatgacct ctgctactgc atagatgtaa gactaaaggt tccagataat tgaagttctc    240
ctgacctgaa atgtaaactc tgtacagtgg ctttgctgta ttctttcaca tccctttgag    300
tctttgaagg tgaggcgggc cacactagct gctgttttcc agatcagggc atgccattgt    360
ttgacctgcc accataaaac agttctacat tcctttgtct gtcttttgag cttaggcctc    420
cagactaacc acatcaggtc tccctagtga tttgtctgcc cccacctggg caagaccaa      480
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<210> 137

<211> 655

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 137

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gggggatggg ggaataccat atagtcatta aagagaacga aaaaggctca cattaaaaa      60
aatttaacat atatcaagta tgcaaggcat ctgcatacct ttgtacatat atttttgcat    120
acatttgcag aaccaaatac ataaattatt annnnnnnnn nnnnnnnnng ttagcctata    180
taatttaacc ctatataggt tagccaaata ctgaaatata acgttaagga aatgtttcta    240
agcataaaag ctagatggcc tatgaaatgg actttgtaca aaagaaatgt ggcaactact    300
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cagtcaacca tcttgccctca aggcaaaaac aaactgctac aaataaaaaa gtggtaacca 360
atgttttcta aagcaaggaa atagtactac aaatttttca atatttaagc aaatgtcact 420
ttacatgtgt caataaattt tctattttag taatttaata actatttctt cattcctagc 480
tcctattctg ttaaagtgac agtattctaa gaatcaactg cattacaaag tcactagggt 540
tctgagtcac ttacagcatc tttatatctt ttacagcata attttaggat actgccttgt 600
ggatcagct aaacactgaa ttctgccttt gacatacttt aacaaggtag cataa 655

<210> 138

<211> 657

<212> DNA

<213> Homo sapiens

<400> 138

gggctaagta ccttacccaa gtacccttag gtaggaacta caaaaccagg atccaaacat 60
aggtctgtgc gattccccgt catggcttcc actcgacaga accccctcat gcactggttt 120
tacaacacaa tgaccaccta atctgaaatt gctcttataa atactgtgca aagaagtagg 180
agctataacc aaactgagta aaatctgcag gcactctggt aagtatgata aagtacttag 240
ggctagatca cctagtgtgt aatctcatag cataaatata caaattatac gaatcagttt 300
tagtttatta ggaaactact ctgatacctaa aatgcaaaat atagcttctt tgcctccttc 360
atgactgcct gctcactgtg tgactgggat gcagtcacct actgagacta tgatgggtat 420
gtttctgcta agaaaagctg ccacatttac tttcccata tatggatgct gccattattt 480
tcctggcatg ctgaatctcc acctcccctc ctcttctccc caccctgtgg cacaagaac 540
atattgtaca ggaaatatac tctcttcctg caagcaagaa aaatgggttt gagaaacata 600
tggggggggaa aacaaacat tccgcattct ctgtttttta aaaatacaac aaaaagt 657

<210> 139

<211> 667

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 139

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gggcattgga aatccagatt atttgaaaga aaagcatata tacaaatagt ctgccaatct      60
cttggcaaat tcatactggg tttatgactc atacttggtg taaagacaga cagaggaact      120
gataaaatag tgatcaccac taaagacatg taatacttat ataacttaaa tgtgcatcta      180
ataatacaaa taagcagttt gagtgattta ataattcaca gagttcaaat gtaattaatc      240
agagaagaac atctaattcta ccatttacag taaatgtctt cctggactat tctctatcaa      300
gtttggcccc aaccactcac tcaaataaac ttactatcat tccttaatct ttctcagcat      360
ggatgtatta cccttgtatt tatgttatgg ctaggatcca atccttttct caaatgtgat      420
actccacatt ctggacaatg taatcagcaa aagtcagac agtttttatt ttaaaaaaaaa      480
agtgtattct ggtaggggtg aaccttacta actgattatt ggacttaa at gataacaaca      540
nnnnnnnnnn nnnnntaaga cattctgtaa tctcaagctc tgtatcagaa gatgtattat      600
cattcatcct gggcatatgc tgctgttaaa tgcaaaatat cagttttcag gaaccaaga      660
taaagca                                          667

```

<210> 140

<211> 595

<212> DNA

<213> Homo sapiens

<400> 140

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ggggtagacg aaataactca ttatttttga gacatttttc acaaattctca cttgtacctc      60
tgagtagtaa cttaatgcta ttactatggt tactacaaag caacatgggt ttcagcctat      120
tctttggttt gtctaagaca ctaactgtca gcccaaaaca gcttgtcttc ctatcttccg      180
agttaccaat gattgggagc ccttaattga cagcactgga ctagctgcaa gtgaactgta      240
agttcatatt atctactgaa ttcaagatcc attttgtttg cctgccacac cccacacaga      300
ggtgctgtgc ctgtcaggat ttcttggtt cacctcatc ctcttctcct caattctgtc      360
ctgacagctc tatgaagcca gaaaagctca cggagatgca tcttctgctg cgtcctgcta      420

```

actccctggg accgcatcct cacaagctac tttgttcaag aactactccc atttccaatt 480
aatccaggag gaaaggaaag gaagatggtg attgttcttc ttacaacaca gagctgtggt 540
agtatgctga tgtttaatat ttttcagggc agtatattca acttggaagt cagtc 595

<210> 141

<211> 560

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 141
gggctgagaa ggcaagctca gttgtgcagc gatgtgcagt gctggcccta cacctctgtg 60
aggggggttg gcttaggata ggcctctctg ggtgtctgag gaggtgacc tgaaacagag 120
atggtctggc aacatgaatg gaaaatacca aggatggcat ggagttcacg ttggccgctg 180
tgcccggccn nnnnnnnnnn nnnnntaggg gacacatgga aaggcgggaa cctccccaca 240
acgtgagtgc aattgttcaa ggacccgtgt gatgtcacc acacctgtc atgtctgtgg 300
aagccacttc ttccacagcc accaagccat ctcggtcac tgcaacaaga gcaaaactct 360
gtctcaatta aaaaaaaaaa aaagaatcca aatatttgca tcacagcggg ctgagaaggc 420
aagctcagtt gtgcagcgat gtgcagtgtt ggccctacac ctctgtgagg gggtttggt 480
taagataggc ctctctgggt gtctgaggag gctgacctga aacagagatg gtctggcaac 540
atgaatggaa aataccaagg 560

<210> 142

<211> 409

<212> DNA

<213> Homo sapiens

<400> 142
 ggggggggatt ggcagcatct ccttcagaaa ttactgtgaa agaggaggaa aatttgattt 60
 aaaaatccag ctatgtaact aaattgaatt tgggactaga aagccttcgg cagaccaatc 120
 cttccagcca tctgatgcgc aacataaggt ttctcataaa acaaagaaaa tgtcaattca 180
 gttgtgaatt catattgata cctggaactc tcttgctaga ccacctctaa aggcccaggg 240
 ttcttgggtct ccaattaaga attgtgctga agaatgacta cgacaccctg ttgagatcag 300
 atccaagcgg agaacgttac gagaaagggg atttcctggg gtctcaaattg tccaacaaac 360
 tgacaaacac ttcgtggaaa taactctcta acaataatca gggtttcag 409

<210> 143

<211> 422

<212> DNA

<213> Homo sapiens

<400> 143
 ggggttgga caagcagaac gggctgggtg ggcaagtgga agagggatca gggcctggta 60
 tctgtgtgtt gtgaccacgc gtggaaagtg acagggggcat gaggcctcac gttgaggtac 120
 tccacaggct tggtgacggt gaacttgtcc atgggtgggtga tgatgatggc tggagtgggtg 180
 aggaagaaga ggaggatgaa gaggacgaca ttgatgacca ggcagcgcag ccaccagatg 240
 aagcctcgga tggagaggtg ctcccagtag atgttctgag ggtcaggggc ataggacacg 300
 gtccagttgg agatgtgcag ggactcgctg caggatgagg ggcgtggctc cccacggcag 360
 gtgcagccct ggcattttaca cacgttgaag tccttcagga tgatggcggg gattgtctca 420
 tt 422

<210> 144

<211> 507

<212> DNA

<213> Homo sapiens

<400> 144
 ggggaggaaa atcacttctt tcaatgggag ccttattttg gggaaaacaa atggaagaaa 60
 tatgcaagta aaagttctgg tcgcgtctat cacatgtata tgactgtgat gtgctacagc 120

ttgatagctg tcaagaaagg tttttcatat ggagagcttc gtctgcttta ctgacttggt 180
 ttagtcctgc ttaagcattt aaagggagca cttggctcag ctcatactca gcttgcttag 240
 tgagtaactg ctctatcaaa cacctagggt gttttttacc cttcagattc cataactcat 300
 cttaatgcct tccattatca ccatgtgaat ttgcttacca ttagattttt agcaatggtg 360
 aagaggtggt aagctagggg gtaatggggg aatattgcta aaaggaaatt gtgttagtag 420
 gcgcactgca aagcaacata catttttagca gcaatattaa cctcatcatc tcacaaaaga 480
 aagcatatct caactatatt tcttctt 507

<210> 145

<211> 554

<212> DNA

<213> *Homo sapiens*

<400> 145

gggatgcgtt agaaactgag gaccgaccaa aattaactat tgtagacttt gaacagtttg 60
 cagtttggtt aggatcacag ggaaaggagc tggagagaaa catacactat acttattatg 120
 gctgtcaaag gacgtgtacg cagtttatat ggggtggcttg aatgggtagg ggcctaaag 180
 ttaaggagta gtgttaatca agacatattg aaaagatgaa ctaaagcatg ctgtcagagg 240
 acaataaggg aaagctaattg tggaatactg gtgtctaggt aagggaatat taaagttggt 300
 ttctttttta ttgttagat gtaacttttt catctctaatt ttgtctcact attcattgaa 360
 actaagctta atttctgtgt gcagcctaca gtatttctgg gtgaggacca aatagtgagg 420
 tccacatcca cttaatatat ttgccaacca ttaaattgcc gctaaagctg cagttgggaa 480
 tctgcctgtt ttaatatctc agtagagtgg tatttgctta gcccaaaaac catgttgtca 540
 attacaaaaa tgct 554

<210> 146

<211> 405

<212> DNA

<213> *Homo sapiens*

<400> 146

ggggtactgc ctcaaaccac actgggagtg tatgtaaaag actctacatg cactgtacgg 60
 cctctctgaa atccaaaaaa attctgattt ctgaaatata tctgatctta atggttttgg 120

ataaggatta cagacttgaa atttcaatta tccaaacatc gacttatccc cactcccat 180
 cccaccctc aggagcagtc caagaaataa acaaagctaa tattttttac ccttgatcca 240
 gcagtaaagt tactcacctt aggtaaggga ccaagttgga ggctgcacat agttacocag 300
 catcaggccc atcaaaggct aactcagaa gctacagtac acagagaaga ggaaggggcc 360
 ccaaccacct .tagaaaggtc ctcaatactt ctggagtcac cagag 405

<210> 147

<211> 567

<212> DNA

<213> Homo sapiens

<400> 147

gggaagaaga caccatatct taccocagac cccaaaaatg ttagggatga gcctgtccgt 60
 ctgtgacagc cagaagtgtt ggctgccagt ggcccagggg aaccagaacc caggagttca 120
 gtggaaagaa caacgtaaca ttaataagag ggaccacccc ctctgcagg ttgtcccagc 180
 aaccaagtct cagctgctgg tgaaggcctg cacaactagg tagttgtcaa agtgacatgg 240
 gaggtaaatg acaaacactt ggttctaggg gtgggttcca ggatcccttc agggcactag 300
 gttcctaggt actgtggtaa taagatccca ctcaggccca tgaatgaggt ggattaagcc 360
 ctttcttcca aggccaactg tgtaatacat aggatccagt agttctgctc tgccacctac 420
 ctgctcactg acctcaggaa caccctcac ttcacaatat ataaatgagt agttctcatt 480
 ctgtattttg gagaattgtt gtaagattga aaggtcacag atgcaacatg cctaagagta 540
 ccagacatgc tggaagtcct tgttttg 567

<210> 148

<211> 631

<212> DNA

<213> Homo sapiens

<400> 148

ggggggaatt aaagataggg ataagacact gtaccataa actttacaca atgacaaggt 60
 attagggcca caggacaggt aatggagag ctcacatctc actgaaggat agaaagggat 120
 gcatgaagaa gatggtgctt ttgtgacagg ccttgatata tacaaaacat tagcaaacac 180

ctattctcag aaaactagaa aagtgcctgct tgtgctaagt tccacagtgg attccttgac 240
 acgtttatag tacacacaca taacagagcc atgtttactg ctagaatatt attcctagca 300
 cctacttttg aaggactagg acatttgcac agagcagtgt gtcttcctgg tgccctggcc 360
 tctggcccag ttttaagaact gataccatag agaatgtgag gtaagaacac attcacattc 420
 ccaccatggc tctggttctc cctgtgaagc tacagataac atgaagacta tcctcctttt 480
 ctttcctaatt cccagtcctt taagtatttg aaaacctcaa aatgctttct ctgagactgc 540
 ttattcatag gccaaacagc tcagttcttc taactattct cacatgacat gcttttgact 600
 cctttcatta ttctagtcac ccaatctctt g 631

<210> 149

<211> 688

<212> DNA

<213> Homo sapiens

<400> 149
 gggggagact aaactacctt tatttgctgg acaacagcat gggtgtcaaa actggaccct 60
 gggttttttt ttccctttca ggacacatac tgtatcatgg gttctttaat ttagtgtatg 120
 gattaggtag ggacatatatt gaaagcacta attcactctt gattgccaaa ttcataaagt 180
 gaactgctta aggttagata agaatgatct atttataaaa tctagtgccaa aaaattaaag 240
 taattatact agaagtgtga tttttatttc tgatcttttt aaagtcaagg gatcagtgat 300
 caaacaatta aatgaagag tccatatctt aaaataacaa attcaatttg taggatattt 360
 tcttttttgt ttacttactg tatttcttgg aattttattt attaagcaat aaaaatggaa 420
 gtgaacacaa ctgcataaaa attttggaat acttctctgt atgttatcat agtcaaaaga 480
 tgtttttcag aatttgtctt atgatgccaa attattccaa aatttcctaa atggttgata 540
 aacagagtaa gaactggatt atacatcagc tcctgcagtt tccaactgca cattccagtt 600
 ttaaagtata accataatgt atgctttcct cagaaggggtg cctggcattt atttatgatg 660
 gtcaattttt tttgttggtg ttgagatg 688

<210> 150

<211> 423

<212> DNA

<213> Homo sapiens

<400> 150
ggggagtcac aatccatttg aaaatatttc ttctctggga ctgaaaatct cctaaaacgt 60
gtattcttca gcaaacaaag tatctcatag aatgtaaagc tggatgactg ggggaataca 120
atTTTTTTtg cgcataatga cttctgtcag tcctctaaga aattcaaaga attttcacgg 180
cttccagttt aaattctagc gcctctggcc atggccatgg tttgttctgt gtttgattat 240
ctttccgttc aggggttcga ttgttactgg gctactttag acaaagctac ctggatcttg 300
agttgccact tttagcccaa aatccccttc ctacctgttt aaggggcagt ggagcacttg 360
gtggccacac tggctctctg tgtaagggtg tttgctgaaa attagctgtc tacggtggcc 420
tat 423

<210> 151

<211> 617

<212> DNA

<213> Homo sapiens

<400> 151
ggggggcaga tgtgtggcgc tatggccttt gttactgtat tcaagctaca atgtcaagaa 60
ggtgggaaag accatgtttg gacatgtatt ttttgggagg aaaatgggcc ccgtagttct 120
ctgcaaaca cagaatcaag aaaaaagaaa agtcgtcttc tccgctgggc gttgcctgac 180
ccccagcccc tgcgccagct ctctggtttc cccatgacca gctgatggcc acacattaac 240
tccctgcctc cctcccagga aagcccaagg tggcagaagg gcagaccctg gccactgac 300
acccccaca ccagaacag aaccagcat caagcaggtg cacaagaaat gtccactgct 360
gaaaccaccg ctccatctca tcccagcacc cgggaatcag tctgtttcct ttccaaattg 420
aggctgcttg aaattccgca cctatcccgg gtgtgatacc ttgtgtgttg actccactta 480
ccaccagaga tagaagtcta atcattctgc agacaatctc gccagataag gctggcagct 540
cgtaaaactt aagtagcttt gtgctgctgc agatggcttc atgcagtttc agacacacag 600
tcaggtagga tgggtgac 617

<210> 152

<211> 640

<212> DNA

<213> Homo sapiens

<400> 152

```

gggataaagt aacaaggctg gggactgtgt gccgtattcc cttcatcagc ctttccactg      60
tgtaacccega aagccgcaac gtcgtttccc tccacgcttc tctctgccgc tagtgatttc      120
ctgggtctgaa ctgtgactcc ctagtgatgg cctgtaactt tgggttctgt gatcatctga      180
agtctatcaa cctctatata gtcagggaaa ccagaagag ggaagaggga agatttctgt      240
ttgattttca cacaagcaag acttactaaa gagttaggca gaattgttca cttagccttc      300
aattcaaaat tgaatctcag gttgaaactt tggggtatgt ggggttggtt tgttttttga      360
aaaatgtacc ctttttgagg ccaaataaaa aggaactaga cagtctctgt tcagagcctt      420
tcagactggg ggtggaattt ggtagctcc atttagcggg ttaatgttga tttaactcct      480
gctgtgtgca tcaccaccct gagctgtgtg gcagctgagc acttccttgg gaagcaaata      540
taggttctgt ctctcaagg aacttttgat ctcttggggg aatccaggac aagcctaaat      600
acaaccatac aaagacctac ttacacagct gacactacag                               640

```

<210> 153

<211> 592

<212> DNA

<213> Homo sapiens

<400> 153

```

gggaaattga tatttaaaag agaaggaggg tgattgaggg gaagcccca ggaccgctt      60
gaggtttctg ataatgaatt caaagagaaa caggtcagca tgggaatgtg acattttcca      120
gctatgcagg catgagaggt ggagaagcgg atttacttgt agattcgcca aatgagtaag      180
acaaagcaag aaaggggtaa gtgatgaggg gacatgcaag gtagtgaaaa ctatgtttaa      240
ctgtggagta taagcttggc caggaaagca ggatggccaa cagtagcttg agggacagtg      300
aaaagggtgt atgggccaga gattgataaa agaactaaat atttgtcttc gtagtggaag      360
agcaacagat aatacctaaa actgaaaata aatcactaaa tggcagcatg agcatgttat      420
tgaaaaatgt gaatgcaaata acaaaacaaa taagacaaaa agttgaaagt tgtttctctg      480
gatcacggga aattagtaag gcttatagag ctgattgacc ttttaaaaaa ctatgtgcat      540
atataacttt agtaaaaatg aaacaaagaa taacagtatt ctctagttag gg                               592

```

<210> 154

<211> 662

<212> DNA

<213> Homo sapiens

<400> 154

```
gggcaggtgg gcctgtgaac aaaccctcct gaggatatga tcaggttgta aatggaaccg      60
taactttttg ggtaatgtga gtcagccctt aagcctatgt taaccaccga aaagagaatt      120
aacctttggg gctttgcaag gctccagctg gtgtcataaa gtagtaacaa aaaactgctc      180
ttcagtagct tgagggaaaa tctttgaaaa atacctccct gggagcagct tccccatctc      240
aaaagatgta gcatagtgtt tttacaacac ctgcctgca caattttcta agtggagttg      300
cagtattaag gccagacctc agcccaggac cgctctccac tgagctcaga gctgtgcagt      360
ctgagccctt caaaaacatc aactggatc tgccagcaga aacagttctt gatcattgtt      420
ccctgttatc tgtggcaaag ttctgactat tcatgatcat aagctgaata tgagaagaga      480
tccagtatac aaatgttttg cccatgtgaa aataagagct caggttgctt taatcaattt      540
taaattattg cagagaaaga aagcaggtaa atactttcat gagagagctt tttgtcaaag      600
gttctcacgt ctttcctcaa gctactctta acaaagtact gtatgtgaca aaattaagtt      660
ta                                                                                   662
```

<210> 155

<211> 514

<212> DNA

<213> Homo sapiens

<400> 155

```
ggggtgatgc aaagggcttg gggcccaggc cagaggggct ggggtgtctc atggacgtgt      60
tcttaggggtg ctcacctggg agaccagaa gaaggagata acacgtaagg gtgaggctgg      120
tccctggaaa tcagctgaca tctgcaaat gtggagccct gaggtggagc caagcccagag      180
gcacagccca ctgagtggca caagccacaa agggccggcc tcacccaac ctgggtgctc      240
gtgattgaca gcctcttgtt acgtgagga agcagcacc cttccgtggc agaaaagttg      300
ggcctgaatt gtttgagcaa ttccacgtgt gcagctgcgt ataccatcca gggatagagg      360
accatgagcc cgaggccctg atgtcctggg gtctagtcct gtgtccacag gcaccactcc      420
```

cctttgtacc tcctgtccca acagccaagc tccacagggc caagactaca gcatcctttg 480

ctcagcaccc aaaccacagc tgtgccaca gcac 514

<210> 156

<211> 490

<212> DNA

<213> Homo sapiens

<400> 156

gggaatataa acaaaaaaga aagaagcccc tcttaccaaa taatgtctgc ctggatgtgc 60

taaatagttt aacaccatth actatatatt taaagggaaa gaagcaacaa tgatggcatt 120

acgataaaga aaagcaaaca gaaagccaac caggggctgt cttgctgagt agatttcaat 180

ttcttaaacc tatccaaaca ctttagtatg tttgttatgc caaatgaaca catttataca 240

tttgaaaatt tgggaacata ttagtaagt gataggaacc aatgggtaac cactgttact 300

tggcagaata tgacggatta atcaagagaa agtcatccac tgggaagtag agtttgagat 360

aaaatttggc tctatagaac tagtgttggc ttcttcagtt tcctaggctg acagagaatt 420

gtgaacttac ctacagggct atcatagtgg gctttaattt tcctgtatgt ctaagtaata 480

ttgcaacgaa 490

<210> 157

<211> 458

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 157

ggggacaggc tgaacaacca aatctagcag tctgtaatca gaatgcgcat ttattgagtt 60

atactgaaaa aacaaaagaa tttagtatcc catttaatca gacctctata ttcactggta 120
 actatgatag ccacatgcaa atacagtcaa gtatattaat gtaatccaaa gtgctaccat 180
 gcattcaaaa agtcagaaaa ttattcatcg caaaacagaa ttaagaactg cacatagcaa 240
 ctgattttta aaaagagttt gcgtcgtcct ccttcccttt nnnnnnnnnn nnnnnnnnnn 300
 nnnnnnnnnn nnnnnnnnta ttttcaaagt aagatgaact gccaatgatt taaaatacta 360
 aagaaaacag gacaaggctt ccctggcaat ctatttacta aaattcatta acatgcaaaa 420
 tatccattca cctacatgta atatatataa tgaatatt 458

<210> 158

<211> 474

<212> DNA

<213> Homo sapiens

<400> 158

gggaacttga gaaatggggg ctctccctgc accgagacag cgcagtgggt gcttggctga 60
 taataacacc tgtaaagagg ccgcaagata gagacttcag tgagatgcgt tttcgtccaa 120
 gttcgtcaga gccacctggg caatgatctt gagtcagtgt ctctttggtg gttttagcac 180
 attccaggac caccaatact accatttact atttttcttt aacactcagc tctcaagttt 240
 tgaagtctgt tcttcgttaa acgtgagagg tcaggagtgt tatagagggg ttaaagatac 300
 cttaacaccc acgagagact ttctcctcag cctactggga aggcctaaaa aagaactgga 360
 aaaaaaaaaa gaggattctg ctttggcaga tccagtggta gcagatccac gtggtgggaa 420
 atgcttttga gctggggaac aaagctgggg aaatagatct ttaagaaagg gagg 474

<210> 159

<211> 484

<212> DNA

<213> Homo sapiens

<400> 159

ggggtttccg ttcgctgctg ctttgctcgc tgccctggcg aaccggaaag atccaaggtg 60
 tttgttcacg aaaacatacg cgaacttggg ttgggagaaa tgggggctgt taatttttca 120
 tgcttccgtt actaccaagg gtttttttca ttttctttgg taccttcttg tgtctctctc 180

ttggagtggg	tgTTTTtgaa	tcatggcgat	tttaatttgt	ctttccttac	cctcacatta	240
atccctaggt	agaattcgct	gctgtagtgt	ttcagaccga	cgctaggggt	gtgtctcccg	300
cctctgtcgc	tgCagccaag	aaatcaacga	cgccctttta	gcctgttacc	ttaccggttc	360
tctcgctcgg	ggaagcccta	gtcgttagtt	tcctctttgt	aatcaagagt	tgtatacaca	420
gtagagaaag	ttcagagtgc	tattccgcgt	atatcagata	ctccatcatg	cgattcagtt	480
atta						484

<210> 160

<211> 594

<212> DNA

<213> Homo sapiens

<400> 160

aatattttta	aagagaaatg	atttcccatc	taaaattctg	cctgccattc	tatcatttaa	60
gagtgaggag	ttgtgtttca	ggcatgatgg	agtagacata	ctttttccta	ttcctcccac	120
aaagtatagc	tgaaaattgt	gttatatata	aaccaagcac	aacgagctgc	tgaaaagtga	180
ggagaaaaag	gcacattgtc	taggacctcg	ggaccccagg	aatggcacgg	cagtcagttc	240
cctggatttg	cttttttcct	tgtgtgtccc	ggacagggcg	ctggagaagc	tgataacatg	300
gaaatgcaaa	agagcagaga	caaaaaaaag	tccaagaaa	agcctactct	gtctagccca	360
agaaccaaga	gaaaggggtg	gcttggcatg	acgaaaatcc	tgtagacaat	aattgctata	420
ctccagtga	acgtcacaga	aacaactgcg	gccttggcaa	aggctgagaa	gagtctagac	480
ttaccgggcc	aggttgtaat	gagagacctc	aatctcctcc	ccatcccact	actcatgtgg	540
tatcatcaga	ggccaaccgg	gaacctggcc	ttcactgatc	acctggcagt	aaca	594

<210> 161

<211> 699

<212> DNA

<213> Homo sapiens

<400> 161

ctttagtgtg	ctgaatgttt	acctgatgtc	taggcaacca	aaaatcagga	ctatgctaga	60
atgttacatt	taccaacata	tccttgacct	aaagtactaa	gcatattaca	ccagtgtgtg	120
tggcttcaaa	tacaagactc	tctatctcta	ggtattgaaa	tggcgaataa	gaattgcagc	180

tctgaaaata taatataaac acattttttca gatagcatta taaaaataaa aatacttttg 240
gatactagaa tttgggggta gagctgactt caataagggg aggaaaaaat atgtgcaaag 300
ggaaggggagc tcaattttgga ataatatatt tcaaagtatg tggctttgca tttttaaaat 360
gctaaccaaa aaaaatgtga gatagagtga cccaaggaa ctttttacag ccagcctctg 420
gataccagat atagcattta caacttctga tatgctagac aaattttcca tagttttaat 480
tttcttaaag acatatagtg agtgaacacc aacactggga aggaggtagt gttaatttga 540
tcaaattattg atatttcccc actgattcag aaagggttg ctctttctat aggatatctc 600
aaaacccttc caatttttat gctacaagct ttactctatg aaggatacta ctatgtatga 660
gattcctcag aagctagatc tcacaaacat atacaaacc 699

<210> 162

<211> 522

<212> DNA

<213> Homo sapiens

<400> 162

gttcagaaga aaaatatata aatccaaaga agggaaattt taaacattgg gtggaagttt 60
cagtggaaat aatggtactt gagttggact tggatgaaca ggatgtacac aaagaggcca 120
actaagagct gtagagcaat gacttaaaaa aagtaatgat gggagagctt ctactttcat 180
ttaaatcatt tctcagaatg aaaacacgcc aacattcaaa tttcagtttt ccagaaattg 240
tgaacatgga ttaccaaagtg ttgataatca tttttaaaga agagataact ttaaaaatct 300
gcttccaaag attcaataca ggtaatttca acatcagtaa tacattattc ccacatatgc 360
tgtcagtaaa aaagtaatct gatcttaggt aatgcaagtg cctgattaga gagtattccc 420
aattcctcct tctcatccct tctaacattc ctgtaattca tttcgctcat ccataagcta 480
taactactga acagattggt gccattatca gcaacaatca gg 522

<210> 163

<211> 473

<212> DNA

<213> Homo sapiens

<400> 163

```

gggtggggtgg ggggaaggga aagagagact gactccagaa aaaaactcaa atatatacat      60
acggaagcac ctcaaattcag tgtgggaaga aaggattatt aaatatatgg ttattatgtc     120
aggtaaataa tttgaggaaa aacttagatc caggcctcac atttcaccac aaagtaaattc     180
acacaggaat tactaatata actgttttaa atgaaacca aaagtactaa aagaaaaata      240
taattgaaaa attatcttga aaaatatgac attaaagcag aaatttaaaa aaaggaaaga     300
ttatacttca taaaaattaa tttacatata tgttaaagca ctacaaagtt aagataaact     360
atgaataagg aaaaaaggta ttatcgttaa catataagtt cttaaacttc aatacaaaac     420
ttgataaaca attcagaaaa aaataatcac tacatttacc aaaatatggt aaa              473

```

<210> 164

<211> 510

<212> DNA

<213> Homo sapiens

<400> 164

```

ggacagtaat tctctgaaga atatgtagca gtttttgatt atgtcctgat caaaggataa      60
ggtagtcggg ttgggtaagg aaatacagag taggtcccag gtcaccatgg tccaagccca     120
ggtgctcagt gtgtgtcctc tctctgcccc ccagttctac cccgtccatc attcaccacc     180
tgctctgtgc tctcgaaggc tgacccttga gaacagcatc agaggccttc ctgcacctct     240
ggcttcttgc tggtttggtc aatggcaggc agcagtggga tactgggggg ctggaggaaa     300
gcagtgccag ggtactccct ccttggcccc ttctgtctca actgctgtgg gtgacctgaa     360
tccctctcaa ggccacactt ttggcagget gccctcttca taaaactacc ctcccaattt     420
cttgtaacca ctccctctct ctaccctctg aagcctgtaa tggctcccgg acgtcattag     480
tgctgggaca ctgcactgtc ctttggtggt                                     510

```

<210> 165

<211> 490

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 165

```

cttctgtaga aatcaacaaa aataccctat ctaatccatt tttgcttcca ttataaat 60
tctaataata gttttttttg gcgggtggga aggcatttga cnnnnnnnnn nnnnnnnnnn 120
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnt ctaatatagt ttttgccctg aaatgaaaat 180
ggaagtgatg ttttggttcc tctcaggcat tcagcaggga gggcttcgtc ttaattccat 240
tttgtagaga ttgcatctgg gccatttgcc agaggatatt ataaccctgg cagatcggaa 300
cccaacactc gggtcttggt tttcccgaac tcggtgccac tctgcacgtc atgggtcatt 360
tggaatgcc ctgatgccct acatgcaagc ctttgtgggc gtctgtagga cgctgtactg 420
gtctgcaact gctaccacat ctttaagctt tctcctgtct catgtatttt cttcatttcc 480
catttggaat 490

```

<210> 166

<211> 549

<212> DNA

<213> Homo sapiens

<400> 166

```

gtaattgaaa atgtcatctt gcctctccct gtccccaaaa cactgagcga gtaaaagcta 60
agcctccctt tctaacattt caaaagcct tgcattgtccc tggaacaga tgttcagagt 120
gattacacac tcaccttggg aagagggtag agatgacaca atggttggcc agtgttctgt 180
ttacaaaact ccagagtgtg acataccaca tcagcattca tatctgcgct aagcctggag 240
ggaaacggtg caaaacaaag gctattcaga tctcttaggc attaggaaac agaagctact 300
gcaaagaaag gtaaattccc agaattgatt ctaataccct caactccttg cagagtggcc 360
ttgacccca atcccgggga gctgctggat ggtaattgatt tctgccact gttgctctct 420
cctgcattta gaatgaggtc ctaaaggcga ggatggggca tgcacagcac tgagctgcca 480
gtcagcctct cacgcgagtg ctgggattct tttcaggcaa agccacacat aaaattggga 540
aagaaaaag 549

```

<210> 167

<211> 402

<212> DNA

<213> Homo sapiens

<400> 167

```

gggctacaag atcaatacac aaaaaccaac tgtatTTTTT atattctaataac aacagaacat      60
acactcacta taagtcctgg caattccact ctttgatgga ataccccaaa ataggggtta      120
cacagaatga ggaaagcaaa gtaatacaat caggggtgtag cacataggga acatctatga      180
tactaacaat gttgcatttt tttctttaat agccaactca ggcagttaga aatatggagt      240
tagtgacaat ggtttctcct ctcttctatt atcttctatt tgctcatctt ccagtgtttc      300
aacttcagtc ctgagactct cctatccaaa gctcatccct tacctgaatc aatactgagg      360
acatcatcat cttcatcagg aatctcaatt atttctgtag gc                          402

```

<210> 168

<211> 555

<212> DNA

<213> Homo sapiens

<400> 168

```

gggatgtaaa agtggcagag tttggTTTTt ttttaaagtt aataaagctc acattggttt      60
tcaagttcaa gattaaaata tgtgctattg atgggTTTTg gctctccagg aggcttcttc      120
tgggctaacc agatacaaat gagtttgata gttaagtttc tctggcttat ttttattatc      180
ataagtaaag tttggaaatt tggtcattga gtggagaaat atagagaaag aaaggaacag      240
ttttctcttt ttcctcccat ttctgggtgtg aacaaatggt aagaaatatt taccactaat      300
catttttcta gtgctactgc acggagcatt gttctgttaa aacaaacaaa aattcccacc      360
atcccagtct tgttttggtg aagttcaggg gagtaagtat tatttgTTTT tctgtaaaag      420
acaacattgt agagataggc atgagtttgt tttttaaaaa ttgttagtgg tagtagtatt      480
aagccactgt ggtctctttg agtggtgtag agagcatatt aatgagaaat tgagtctttg      540
aaatagaaat gtaat
                                                                555

```

<210> 169

<211> 543

<212> DNA

<213> Homo sapiens

<400> 169

```
ggggccagct ccatacagca gtgcaggaca ggcagggcgc ccagccaggt gtacgtcctt. 60
gtgtccatgc atctttggca caggttcacc aggtacagcc gccagctctg aggtatccca 120
aggatgtggc ttaggtcacg gtgaaactca tctggtgagc tggcatctga ggtaggagg 180
tgacacaacc agtccaggct gccttctaataaaaagctcaa tttttttcac tacaaaaagg 240
acaatcaggc ctgttttcag tttactcctc actgggcagt ccacaggcaa aaagtccgtg 300
ctttttccgt ccggcaatgg taccacgtgt tttttcagat gttgccacag gtatctcttc 360
acctctttct ccctgtactg caaatcggtc cacagctgtg cctgtccttc ataatcata 420
ggctgttgca ggacaaagca aaactgctcg aactgggtga agaagctgtt caggttgatg 480
gtgtcccagg tctgcaggat gctgaagggtg ctgtccagca tgagcgcagc ggcaatctgc 540
ttc 543
```

<210> 170

<211> 601

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 170

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gggtatcaga gaaaggagtt tctgcagttc aagactgagg acaatatttt acaaaattgt 60
acatctctgc tgtcaagaaa gacaatttat aaaggctctga gtcatgtttg ctattatttc 120
acttctcata tttctgaaat tttcaggaaa aaaaagtaga aaaaaaactg cacctcaatc 180
```

tgtctgtaag tttctattac ttacttccca gatcttcaat ttgaggagat gtcccccatc 240
 ttactgagac tctccagcca tattcacaaa cgtttctcag cttttgattt ctttttcagt 300
 gtcagnnnnn nnnnnnnnnn nnnnnnnnca cttggataca attatagaac agaatataga 360
 caatatgaat aaccaaaaac caaatgttaa aaaaagagga tccattttca taacttagtg 420
 cagttgagac ttaagttggt ttcacatagg atggaattaa gaggaaactg ggttttctca 480
 gtacaacttt gggtccctca agatcatgta aaagctagat gggtccccaca gaattcagaa 540
 agctttcgga tatgcatggt ctaataaatg tctttacatt tttgatggac cctggcgctt 600
 c 601

<210> 171

<211> 696

<212> DNA

<213> Homo sapiens

<400> 171

gggaaaccag acacactgac aggagcagtc actgttcagg gtgcacatac agctggctaa 60
 gagaatcctc acccagtgtt gacagatctt tagatttcac caataaatt agaaatgcag 120
 atttttatgt aaaaattcca gaactttaaa tgttggaac taattacaat gaaaatgctg 180
 tactggtcag tcaactgccag accaattgac aagtcttcag gccaggtaca gctggcaggc 240
 tcctaccgta taagcctaatt tttactgaaa caatgtgatg ctgcaatgag ttagacacag 300
 aaatgaacaa caacaaaaat acaagaaaag gtaacatttc atatctatta gtactgttag 360
 aattactgaa aagatatcaa gaaaattaat ggatttgaaa aagggccaat aaaatccaga 420
 tatatcaaaa attaaagaaa ttaaggatat cagagatagc actgtgaata tgatctgccc 480
 ctccaatata aacaaaggca agttctaaaa acaaaagaac atctcatgaa aaagtactta 540
 tataccaaag agcactaata tttttaagaa aaaaatgaaa attctaaaag aaatggtcag 600
 taaacaatct tagaaagatt aaaacaaaa aatattcgac aaaaataaat ttttaatcag 660
 atacttggtt agaattttta aaagtgttca cacata 696

<210> 172

<211> 413

<212> DNA

<213> Homo sapiens

<400> 172
gggtaaagaa gcagtggctc ccaggggccc tccatgttct ttgcccactc tgagagtagg 60
cacctcctta catcatgtgt cctagatgcc ttgcttgcct caccctagtc ccagccctga 120
ttttcatttt caaaaaaaaa tcagaattat tcttaaccaa tgttatctat tgactattat 180
gaggacatga tcctctgaac aatcaagtga ataaatcaat cctgtttcat caggtaaagt 240
ttcaagtga tggccaagca tttctagggg gtcacaccag ctgttttctt tccatatatg 300
caatttgagg aggcctttgc atgtgtatat atgatgtaag ttggtagtaa atggtttctt 360
agaaaatgat taataacatt agatttggtt tactaagctt taatttttac ttt 413

<210> 173

<211> 512

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 173
ggggaatttg aaagtagtat tcattggaaa gagactccaa gaaaatactc gaagacatca 60
aaagctggat tcgagggtat aacgtgtttt gttttgtttt ttaaattaga aaaataagga 120
attgcagtgt gattttcttt ccccttttaa cttagaggaa cgaggattat acagaaattt 180
gaagtaagtg aaaaatcttc ctataaatct aaatgcagta ggtnnnnnnn nnnnnnnnnn 240
nnnnnnnnnn nnnnnnaagt gccatctgtc tgagcatgtt tcctgaggat ttgttgactt 300
cagtcattgg aaaattcctg ccagcgtttg ccagttactg cagccattcc tgtagatacc 360
cttgggcata tttcttgggt tgagaaggat tgtacttttt ttttttttta aaggatttac 420
tttatggtag agaaagggtt aatactaaca atttgattaa tataacttag tacattctgt 480
ctaaatgtta gcacttaaag tcttgggaatt aa 512

<210> 174

<211> 583

<212> DNA

<213> Homo sapiens

<400> 174

```
gggctcgggc agcccaggcc atgacccgaa acaatgaact acgtgagtaa ctgcagacat    60
gatgtgtgga gtggtcaggg aagtgcagaa attggtggat cctcctgaaa gcagacctaa    120
tgactaacag cccagggtgc taccaaagag ctattcatat gagaatttca aatcccaaga    180
gtgatcagaa agtaaacaga aaactccccc tgccccaat atggaccagt agagaggtag    240
aaaggatgcc agagataatc atacttgttt agaggtatcg taattttatt tgtggtgtgg    300
tttcttgttt tgttttgtta atgtgggatg ggctgtgaag gtggcctaag aactaccaa    360
tttatgagtt tggctaaggg actggaaagg agaagagtgc ctttgcagaa agcaggagct    420
ggaacaaaca cttatgttta atattgctcc ttacaggtc gccagcaaaa gaagagataa    480
cactgcattt ccctttacca actagcgctg ggagcactgg acacttaaata cctcatctgt    540
cctcctttcc tgtaaataaa agcccttcta tccataaaca aaa                    583
```

<210> 175

<211> 478

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 175

```
aagaagaggt cttaacact tactctcaat tcatgtactt atctcatgat aggctggaag    60
caaacaaacc tccctcttct gtggctgcag tattttctcat tggacagacn nnnnnnnnnn    120
```

nnnnnnnnnn nncatgcttt gttaatgtta acatactact gctgctttta acatttcacg 180
aatctctgga acattctatg ggagtaacat aaaatgttct atactattta actacaagca 240
aaaatagagt atgaagcttt tcagaatgac aactgtcaca attatgaact aaaactcaga 300
gagggtcacc cattagtttc cttggttaca tccattgtaa aagaagcaag atcaaagca 360
ctggatcaga cacacaagtc ctacaataag tgtccctgaa ataacctaaa tataattgta 420
aatataaaag aaaaacaaaa ctccacattt aaaatattca agataaagag aattcgga 478

<210> 176

<211> 629

<212> DNA

<213> Homo sapiens

<400> 176

gggacgtgga agatgactgg taaaggtaac tgggtcacgt gtaggttttg taaggaaaag 60
cactgtagac agtccaggca gacaggcagg gctaccacagg gagcagagac aatggagcag 120
tgcaaggctg cctgggaacc tggctatcca gagcgacgcc ctgtctagaa ctcccaccag 180
ttccaccgtg agcagaggag atttatgcaa gaaaaagcaa aaaaatttac caactttggg 240
cacatcctat ttgactcctt atgtcagact gttctacccc ccaagaaatc tgagaattgg 300
cattgtaaaa aaacacttca aaacattacc tgatactatg agaaaactaa gtgctgacaa 360
atcttatttc caggtggtga atattgttca acccacatat gataatacta ataatacata 420
aaaattttac caataatata atggctatgc aattttttaa aattctttga tttaaaaata 480
aagttgaaag catcatgcc aagacagta aaagagttac tagtcttcaa aactgacaaa 540
caaggaagat attaacaagt accaggaaaa tcaaacacagc attgttcact tctaaaaagg 600
aaaaataaat tataactaaaa ttattaagc 629

<210> 177

<211> 547

<212> DNA

<213> Homo sapiens

<400> 177

ggggagtctt caaatggctt caatacacca ttgaagtaag aatggcctt cagtttccaa 60

ttttatggct atatgggacc atgctgtcca accccaaata gtcaaaatct agtaagacca	120
aattttaatat agtacaccca aagaaaatta ggaaaactta aaaataagcc agataatatt	180
cagtgatagg acaccttttg ttttaacatt accgtgttaa acatctatcc ctctattgtg	240
ggtatatgtc cttgctctca cactactctg tgtttctcga ggtaagacag ctagtatttt	300
attcctgaat agtgcctaca ctgagaattt atagaaagga cagcaaaatt atttgaaaca	360
tgaaaaatgt tttaaaatga aaatagtaat tcaccataac aagttctatc acagttaata	420
taaattgagc accccaatct aaaaattcaa aatccagaat gttccaaaat ctgcagtttt	480
tggagcagtg acataacgcc atgagcagaa gattccacac ttgatctcat atgacaagtc	540
acagtca	547

<210> 178

<211> 675

<212> DNA

<213> Homo sapiens

<400> 178	
gggtgttcac acatttgagg actgaatgcc aggagccata ttgaaaaaat catttgatac	60
tggagctgaa agccacactt gttactcaac actcccatta tgctgaaaaa caaacaacaa	120
aaaaaacac atttacaaaa catttagaaa gaagaaataa gcaattattc tctttttgca	180
ctaattggaac aggtctctct gaattatgtc ctgtttcttt tctgccagca ataacaagca	240
gctagattgc tactcacaga gaaccatttc cagtacagct ccacttaacc ctctctccaa	300
aagtcacagg atctcaggaa gcaggagctc ctgctgtgcg gcaagaagaa agggaacaaa	360
gacttgtaat atggcaacgg gaatggaaag agcaatcgga cagacaatag agccaaatgt	420
tacatggaga ttttgagtct gggcaaccaa taagaccacc gatagcttta aaataaagga	480
aacagagaaa agaagggaag cgcttggtga aaacctgtga tgggttcaaa tttgacatag	540
ccaattactg aattcggggg tcaggaaaaa cctcagtttg atcaagagat caaaaacctc	600
agtttgatca aatttctagt ttgatctctt actttactga taaggaaact aggaaaatga	660
catggacatg aagga	675

<210> 179

<211> 684

<212> DNA

<213> Homo sapiens

<400> 179

gggaagagct gaaattaaag tcagacagga aaatacagga tatttgactg gtattttccc	60
agattccaca ccaggctgta gccactgggg aagaaggggg ataactggag attgggcaaa	120
tttggaacct caagagatgg caaagatcag aatcaaccaa agccttcttt taaaattgca	180
tttccttgta tttttaaggt aacttaagac tgtgttctgc atgttctcac tgaccacata	240
aaaccttgag agatcagagc tgcagaccag cagccctgta aattcactgc tgattgtaag	300
caaaagcagc tagctgactc tattactgta gttacagaaa tatctttaca aataatgcag	360
tgcagaacaa taagacaaat gatgccaaga ataaagggcc cctccttgaa accagagggc	420
ctctgcaggc ccaaagagga cagaaggcaa ttaaggactta ggtgttgggg ggaatggaga	480
gaggttttct tattttcctt ttctgccatt gctaattttt ttaatgtgta tgcctgaggg	540
tgagaatcag gagatttatg cattaggtgg atgccctcct ttgcaaaatg gacaaaagag	600
tcagcttgcg gagcagatta gatggaagag gccaaagagc ccaggggctt caagctccaa	660
ccaaatggga aagcaatgag tggg	684

<210> 180

<211> 532

<212> DNA

<213> Homo sapiens

<400> 180

gggtgatagt agccaccaga tgcaaaatgc ctcaaatttt agtcaccaca tggaagagaa	60
gaagcctctg acctggaaca cctagcctgg tctatagatg aacaagaaat aaacttctgt	120
tatgtttgaa cattacagat ttggttctgt tatagcaagt tagcttacct tgactaaact	180
gttgccctgc tcttgaagg tgtgccctcc ttccctgaaa gtgacttttt catacatgta	240
atttatattt taatccatat tctccgaagc atatccacat ctattcaact gtttccatgt	300
tttccaccaa cagaaacctc atataaataa atatatatga aggtttattg cattattcaa	360
ggttctttta aattttattg aagtatagca tatataccga aatgtgcaca aaaaatatac	420
actatctata tacacattat aaataacaca tatatctgca gaaatttaca atgctatcta	480
catctggggc attcccttcc tttctacttt ttctcatttg ctattttttc ag	532

<210> 181

<211> 572

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 181

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ggggagcggg ggccaaagct gtgtggagga ttgcgtggtt gtttagtttc aggtaagcca      60
gtattcctag gaccaagttc atagcccctt ctcagtcctg tttttcctga ctctgcctgt      120
ctatggattt ttcatgtcaa cttgccccaa gtgcaaaggg tagttgcctt gaccactta      180
accagggggc tcagagagac actccaccgg gctcaaggct ggggtctggt atccaccttt      240
ccactccann nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nncagtgtat aagaatggct      300
gtaacaaaaa cccagccatt atccagaact tgacctctga gaactcatgg cctagaaaat      360
aaatacttgt gatgtcatgt gaaaagatgc aatggtaa atgtgcaaga gaaaggaaag      420
aacagagaaa gtaaacctaa ctaagcctgg tctccctagc agcatgggtg ataagcagac      480
atttttatca tcaacatcat aattccaact gcctgccttt cccatagcca tgagagtgtg      540
gattaacagg gcaacagggtg gtgctttggg ag                                     572
```

<210> 182

<211> 547

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> () . . ()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 182

```

ggggcagggg aacaataaca ttttctcagg taacaaacaa accccacagc ttctttcata    60
tacataaaat aatttactaa acaatttaac ataatagaaa aaggtcatac ttcattaaca    120
gcaccaaatt tgaacatgtg atgttgtaag tctaaagagt tctttgatct aacctttggg    180
ggttnnnnnn nnnnnnnnnn nnnnnnnnnn agaggaggag tagtagattt ctctctagt    240
tcttctaagt tcttctcctc cacttggtgg ttcagctctt cagtctttgt ttcagatct    300
ggctcaggtt caggttcatg agaggattct tccaaaggct cctctatgcc attactacaa    360
taaaatattt agttcacttt ttagtaggag ttcaagtaag aaaaaattca atttctctct    420
aatccaatgg gtgtaactag ttatatgcca ataacttggt ctagatctac aaagtattca    480
aagcaaaatt ccaaaaagag ctattagaca gaaggaataa tactctcaag tagcagttct    540
ttaatcc                                           547

```

<210> 183

<211> 525

<212> DNA

<213> Homo sapiens

<400> 183

```

ggggtgaagg tgggtgttga gacagttaca gagcttaatg ctttttgctt gtcagtagta    60
ttcttaatcc acagtaggat gaccactgt tcttcagtg aaagttaat gaaatatgtg    120
tcaataagcc atcttttcct tttaacaatt agattgttat agaaaaataa gtgaagacta    180
aaagtcccag aaaacagaca catcctttct actacataag ctcagtcaaa gacattatca    240
tgctacagct agcgggttta aatattaacc acttaggaaa aaaaccaacc atatagggca    300
atattaggat tttctgtgaa tgaacaatta aaaaaatgca aactctagaa ataaagcagc    360
acacaaaagt tacatactaa cagtatcctt tgggtatttg catttttgct ctctacttta    420
aacttttagg aaggaaacaa gacatattaa aggactgtgc ggcttcagaa aagagtgggt    480
taagagcctt agaagatatg aaaatagttt acacaccaaa gatag                    525

```

<210> 184

<211> 733

<212> DNA

<213> Homo sapiens

<400> 184

```

gggttggtgc tttttaaagt tataccttta acaaagctgg aggttttttc tggagacagt   60
aatagatagc aagtgctctt ttctttaatt ttcctatgat attggctaga aaatggagtt   120
ttgcaaactc gatccacggt ttagttttagc catctttgct ctgctacctc tctgccatca   180
tctactaagg gatataaaat ttcccaaatt tttctttttt taaagacagt tataaaagag   240
ttttaaagtc gcataatagt gctcttcaaa tacttgatga actgccagag tacaaaagga   300
ttaggtttac tcataggacc ccaaaggata aaattaggac taacggggaa agagacctaa   360
caaagcacca aaacctagaa gctggactaa actgacttgg aaaagaaaaa acctatgtaa   420
gcatgaatga gagaattact tgataatggg actgaaatat ccatgcactg tatgattatt   480
tggaactaat ggccttcaag gtcccattta accttgagat tccatgagtt tctgataata   540
aaccttaata catgtcattt aatattgatt ccacttaaaa gggaacatgt tatgagatta   600
gggaagtcac caatcacaca atgtgacttc aaaaaaatta gaaacttctc tgtataaaaa   660
tgagaaaatc tcaaatgttt agaaaccaa aaaatgagaa tgaaatcaga tgtgaaacag   720
atttctattt gca

```

<210> 185

<211> 553

<212> DNA

<213> Homo sapiens

<400> 185

```

ggggatatcc caagatgagg aaggtgaagg acctgaggca gagtccaggg cctgggtggag   60
gctcaacaaa tagtcgtttg ttcccctgaa tgatgagaca ttttccaggt ggacaagagg   120
ggaattaggt gtgtagagac aaaggagata aagctgcaca tctgggtgac ggtagtgaag   180
gcaggataga gaaaagcagc ctagtggaac ctttttcaca ggcatggatt tgtctacatt   240
aaaatcagtt tcttgaaaca tcatttttgg aaatgccttc acagaatgaa acacaagtgt   300
attactggtg tacacaactc caacatatag aaagggtgtcc cctccccatg ccaaccctg   360

```

ccacaaatgg ctgccagact ccctaggcgg acacagccac cagctcacac tgggatcggc 420
aatgcgtgct gctgctggac aactttccag gaagccactc cagtgacagc ggtatttcaa 480
aatgcttttt gctgttgcag tctcagctag gatcttggcc ctcaaggaat ggatttgaca 540
atgtgcaacc cta 553

<210> 186

<211> 564

<212> DNA

<213> Homo sapiens

<400> 186

gggtatgatg ggaggggtgta tttttcagga taggaaagga gtagaggggt aaaagttgga 60
agtagcaggg tgagagagta ccaagatggt tttcttacgg ctacttggtt cttattttga 120
acataaagtc aaattataca aacacatttc gacaaggagc tataactcaa gtatgcggca 180
tgttgctatg acttcataaa actacagaga ttaaggaatt cagaatccca tggaaattct 240
taaacagagt ttggacatat gttgtttgat tttcccttca gcaaactgggt aaacattaat 300
cttgctaacc accatattgc ttatcccgtc ataaaatttt aaaagggttct tttttgaaaa 360
gtctaaaggg aaaaaggtaa cttgcaaaat aattccacaa actatataac taaaaaaaaa 420
aaaccccaaa aatgtatgga catatgagtg agtagctctg tatatattca agtaatccaa 480
gcagtgtcag gctttctcac ccgctgaaac tccctgggaa ggtcaagcat tcagagaaat 540
caggtcagat tacactgaaa agaa 564

<210> 187

<211> 525

<212> DNA

<213> Homo sapiens

<400> 187

gggagattga caagaaaaat gaaaaggtaa gtttgggagc atatgaaatt gtatgcaaga 60
ctcttaatag aatgacatat aaggataatg cttttctggt tcataagatt gtatgtatac 120
ctctcattta aacaaaactc agaaaatctg aattaacat agtggatggg tggtaaaagt 180
ttaactgagt tgtttttggt tttttaaagg aaagttgcat caccaaatac tttaaacatt 240

gctgtggcaa tactaaatat tcattatacc aaaaacaatt cattcacaac ttgaacatct 300
tgtgtaagtt ttcagatata taacatatat accttttatt caaaaacaga actgtggaat 360
tgtgttacct ttgttagtaa gacacatcta gcatgaaaac cttagcaaaa tcgttcagtg 420
atgttttagtg ttgaaataga tttctgttgt gttggaaaca taattgtcta tttactagac 480
atagattaac ttcatttaac aaaagaaaat gtgggccagg tgcta 525

<210> 188

<211> 619

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 188

taaaaaaaca tatgaaagta aaaaaaatct atgattaata ttctcataga gataagagaa 60
acatatatcat aagcaagaag aggatataaa agttacattc agaaaacata aagcgctctt 120
gcaaattaaa aatgtgatag cagaaatgaa aaaattcaac aggcaagcta gaagaagggtg 180
tataatcatc tcagtaagta gagcaaaaac acaagagaga aaaaacgaga gaaaggggta 240
gataattaaa ggattaaccc aggcgggttca atagctaaat agttcagaaa gaggataaag 300
taaagaaaag taaagtaata nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnntaat 360
aagatgaaaa tttcctaaaa ctaaagctag taggcattca gattttaagg gtgtgctaag 420
tgccaagcgc aataaaacaa aagaaaagaa caacaaaaaa actccttctc ataccaaagc 480
acagcagcat gaacatggag ataaaaagga cctaaaagggt ccagaaagt gaacaagtta 540
ccaacaggga gtgggagtc acatgagaga tgtcagcagc agcactggaa gccacagggc 600
atggagcaat gatttcaaa 619

<210> 189

<211> 593

<212> DNA

<213> Homo sapiens

<400> 189

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gggggtgaat agagcagggg caactgaagt tggctttcta atccaaacaa ttagattaag      60
tgacagtga  cataggaaag aacaaatatt tgctcagcct actgttaggc tctttgccaa      120
ctgtcccac  gtggagactt agaaagccaa gtccaagaag gcgagatgat gccagacagc      180
tgcccagcaa gccctggccc caggtgctcg caaatccct ctctttgcat gggcagtatc      240
ctattccact ttgggaaaaa acaagagaaa ctgagaaagc caagggattt ctgaagtatt      300
agaaagagat tagcactgtt taaccacaaa tgacaggaac tagggagaga ggaaggccta      360
agagccagga tattctggca ggtactgtct taaaatcata cattaaccag gtgctttgct      420
tctcaggtac taaatccatc tgggaacaca tacatcaacc taaaggccaa gtctctagag      480
atcccttccc aacgagcttt ttctaccca tgctcccagt acacatgcaa aggcttttgc      540
ttccactggg gaaaaaaaaa aacaggaaac tcaagtagca ccgttccaca gca              593
```

<210> 190

<211> 535

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 190

```
gggggacttg gtggggaggg ccttcattca cttttgaaaa accagttact taattggata      60
ggcagccttt ctcatTTaaa ctgacttttg tttcaactta ccaaaaaaga gtttactttt      120
aaacctgttt acttttacac gnnnnnnnnn nnnnnnnnnn nnnnnnnnng aaaatgtggt      180
```


cttctgggtca tgctggttct taggatactc aggggaagcc agtccccatc tatatataat 240
 agtcactgta ctgaaatgta aattttaaato taatggcgaa ctagttaagt aacatttttaa 300
 tgaatatccg aagaagatgc aacagcaagt tagtttgata tcatcagaat ccaggtaaaa 360
 agaaatacct gagaatccag caattattat taacaactct tttcccaatc ctttaatat 420
 tctgaaagaa taaaaataaa ctcttagcaa tggaaacggg taccgaagat aacagggata 480
 gaagaaaatg tactcttacg agtctctgaa ttttgaatta tctcaatgta ttaac 535

<210> 191

<211> 614

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 191

acttttttga ttttcagaag caacattgag caactatgac cctgggatag gacaaatttc 60
 ttaaaacata aaaataactc acgtttgaaa atattaaatt ttgtttacaa aaaaacccaa 120
 agtgaaaagc tacaaactgg atgaagatat gtgcaagaac aacaaaaaaa caacaaaaat 180
 atcaatatcc taaatacaaa aaactcttaa ataagagcaa aaacagaaaa ataaaagaca 240
 tcaagacata tttcacagaa caggaatgac taataaacat gaaaatgttt ttaacttatt 300
 aatcagaaaa atgcatgttt tcttttatag tgaagtgagt gctgtcacat tcataaggaa 360
 aatgcaattt aaagccacaa taaaatacca ttttacacct aacagattgg aaagaattgg 420
 gtcttatgat agcaagtaaa taagaaacca tacnnnnnnn nnnnnnnnnn nnnnnnnnnn 480
 nnnnnnnnnn nnnnnnnnnn nnnnnngtta aaaagctgat caggcacatg ccttacaaac 540
 caccaacttt gaatctaggt ttatatgcta aagaaactct tggacatgag caccaaaaaa 600
 ttggatatga atgt 614

<210> 192

<211> 621

<212> DNA

<213> Homo sapiens

<400> 192

```
ggggtctgga agagttaaaa acagctcaca ctgaccaagc tggttctctc tagtgaacag      60
ggtgtgggtg gtgcttatgt cagcagccca gggccatgtg tcaggggtgc caatgggcgg      120
agctgctggg ctcgattcct gtggtttggc accacagctt gacttgcttt ggctttgatt      180
cttttcacac actgagctca ggttctcact gtctccttta cctcccacct caactcacat      240
ttaccaagcc tcactgtgga cctggctaca gggatgggca gagtgtagg gcataccccc      300
gggtcctgga ttgtgtgagg gcgttacctc ccaagagaaa cctgcttgca accatgtgcc      360
aggccagctg ctgtgagaaa cccttctctt agtccagaga agtttgtgca ctttacttac      420
ttagactctc cttttctctc tctctctttt tttttttttt tttagatgg ggtctcctgg      480
cacttgcttt tcttttaata tagaaataga tattgggatg ctatatgcac atattaaaat      540
atatggatgt tgaagagcaa gaggaaaagg agaaactga gtaaagaatg cttggactgg      600
gccaggcgcg gtggcttcag a                                          621
```

<210> 193

<211> 481

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 193

```
gggatggcga ggaccaaact caggacaccg agcttgtgga ggcctacct ggagggcctg      60
```

tgcggtggagt ggctccgcag atacctggag aacgggaagg agacgctgca gcgcgcggac	120
cccccaaaga cacatgtgac ccaccacccc atctctgatg tgtctctcac agcttgaaaa	180
gcctgagaca gctgtcttgt gagggactgn nnnnnnnnnn nnnnnnnnnn nccccctttg	240
tgacttcaag agcctctggc atctctttct gcaaaggcac ctgaatgtgt ctgcgtccct	300
gttagcctgt ctcaacttta tgtgcactga gctgcaactt cttacttccc tgctgaaaat	360
aagaatctga atatcaattt gttttctcaa atatttgcta tgagagggtg atggattaat	420
taaataagtc aattcctgga atttgagaga gcaaataaag aactgagaac cttccagaaa	480
a	481

<210> 194

<211> 722

<212> DNA

<213> Homo sapiens

<400> 194

agaagcaagt gatgttaatc aagagaatat atttattaca aagtaaaaat tcagacaaaa	60
ctagaattca atcaaaaata tttagatgta agaaagtcac tggaaaaagg agtatgtgtt	120
aacaaaagac tttttaaaat aaatcggcca ttaaactgtc tagtattgtg caactctaag	180
aacatgtgag aataagaaaa aaggaggaaa acaatctttt aaaaccatgt cagatgatta	240
agctagcaaa cagtgaatca tgtctagtta tattgcattc aagttctagc tcttgttagt	300
catttatattt aaattaaagc atcaaaggag ttcaaaagtt gacatgcaca caaaaaaatt	360
gtgggaactc agcccagtta caccactctt acattacctt agatatgagt gaagcaggta	420
ccgagagtct taattaatgc ataggtatga ggcaacaagg aattcttaat tatgaagact	480
gagatgcaaa aaagcaaaaa cttagccaaa atagttcact ataaaatatt tacataattt	540
ggaaaagggc ctcttttttt tttttttttg caatatatag tggttttaat tttcgtttac	600
tacatccaaa gtaagaaata tttttacatt ataaccacac aaacatttca tgaaacatta	660
tttaccttta ctacatgtta tagatgtgta tgtttcctat ttcttccttt ttttgtttta	720
tg	722

<210> 195

<211> 451

<212> DNA

<213> Homo sapiens

<400> 195

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gagccagcgc accacaccaa gtgacaccag catggcggct cctcgtctgc cgtcatgcgc      60
tgataacaga ggcgttagaa ggctttcctg taaacgcccg acagagatta ggcattgagtt    120
tggaatgaga tcaacaactg aagtaggggg tttgtttgat tttgctcca aggaaaaaga    180
aaagagcaat caatgtctgg ttccaggact gtcagacaaa agctccttca agccactcag    240
ctggccttgc aggaacacag gcacctgagc ccggctgctg ctgcagctca aggtccctct    300
gggtcacgtg ggagagggat tctgtacca gaaagtggca gaggtcctgc agttgggtgac    360
agatgccaca aagagagcaa actgtgcca aggaaataaa cacgtaagtg aggtttgttc    420
ctaattctgc gactttttaa aaagccagag t                                451

```

<210> 196

<211> 457

<212> DNA

<213> Homo sapiens

<400> 196

```

ggggtccttg atgggaatgg cgggaaagaa gccagggaa gggatgtggg ggaactgggt      60
gctggagacc aaaggctcca ggccgtggaag ccttggctgc aaaccgggga gctgggtgat    120
aattactgac acttgggctc atcctgaggt ccatcagagg tgcccaggca cctgacccta    180
aaacaggcag cgcttcatcg gctacccgag agactctcca gtttcagaga ggattccagg    240
ggcctgagca cgacccaaat aaatgagagg ctaacaccag taatccccga gctctctcgt    300
tccccacca ggctgctct cctgtacca ggcagaaaca gggacagacg aggcagtggc     360
ggggcaggat ttgtgagtgc caagcacttc gtccccctca cactggatct cagcaaccac    420
tgggtgggta caatgggtgc atcttttctt ttttggg                                457

```

<210> 197

<211> 469

<212> DNA

<213> Homo sapiens

<400> 197

gggctttggg gctaaactga gttgaattcc aagcctgttg gccattccca gcattgccac 60
 tgctgtgtta gttttctcat ctgtaaataa ctgcctacat ctcacagggc ctctaatagt 120
 taaatagatt gtaagctgca caagcatagg aacagtccat ctttactctt taaatagggt 180
 tttggctttt cttaattaca ttcatTTTca aattctTTaa aaaaaagaat gcattggtaa 240
 tatgaagaga tatgtatgat atcacagtac aagagcaata caatgttatt taaaaaagta 300
 tgcttcatag aaacctTTaa ttcaataggc tTTtaactga ttacaatgat atttagtaga 360
 gtaattgtca gagagatgtg taatgtacta actgagacat gaagtttata agggccatgt 420
 cacatgttta atgtgacatg tagagaaata tttattTTaa aacttggtg 469

<210> 198

<211> 512

<212> DNA

<213> Homo sapiens

<400> 198
 attgaatttt tcttaaaatt ctcatggcat ttttccaga agtcaattct tgcttgTTTT 60
 agtgaccact gttcaatgtg ttttagggc tgcatttctt gtgttatctc tTTaataacc 120
 aagttgtcca caggtaactc agctaattct gctaccctcc tggccaaagc gaattgtcca 180
 tctgtctgca gtctttccaa aatagatcta cattcatgct gaagattctc aatgctgtag 240
 ctggtaataa ttgtatgatt aatggctatg gatgtatcct tcaaaatctg gcaaaggatg 300
 caaagctttt tcacatctgg accatcagag aagagatgct ctctttcaac aaagagctgt 360
 aaaagcttcc ccagctcata ctgggtctta cactgctgta gcataagctt caaaaggaaa 420
 cacacctgat cctccagcca catggcaggg atgacagggt ggacctttgt ggctgctgtg 480
 ttaagctgct gctgctgttt ttttttcttt cc 512

<210> 199

<211> 489

<212> DNA

<213> Homo sapiens

<400> 199
 gggggggaga aatgaacttt gaaactatag ctgacatcgt tgTTctTTca gaggttacct 60
 taatatgtaa gcctgcacac ttactctac taagttTcca ctgggtctga gttattctgg 120

attactctct tactctccaa tacaacagag cccttggtat acttgaattg cccattgaac 180
 tcttctcaat atttgtcttg catatagagg tttagttaca gatttccttg aaacatagag 240
 tttttctaag tcatgttctg tacttactat aatttctttc accccacact ttcccttttc 300
 ctcttgctgg agtgcctccc ataataatcc tttatagagg gagtgatggg tgttttgtat 360
 gtctgaaaat tcctctatatt tgctctttct tttctgtaat aggcatacgt agatatttta 420
 tttgaaggtc tctgtttttc atttccaaga ttctgatttg ggtctttttt atttcatttt 480
 tgaaatggg 489

<210> 200

<211> 654

<212> DNA

<213> Homo sapiens

<400> 200

ggggatgttg tagtattgta cacatgtgtt aggttgaaaa tgggccttaa gttcttctct 60
 caatgaaatg tggattccac agtcgcactc cattgctaca acagatcacc atctttcagg 120
 ccagttcttg tgattacatt aaaaatagct cataacattg tcccattacc aatcttttgg 180
 ggaaggttac ttgactcttc tacttcatte agagcagtta ttgaagattg aatgtttggg 240
 aaatgttggtg taatttcaac aacattagcc ttttaattcta gggctttaaa atctgtggac 300
 aagagcaata gccagaggagc aacaatttat atgctgttag ttgggctctt tcttcactta 360
 gtgatctctc cgcactcttg cagctgtctg tgactttgaa gtgcattagg tatttcagtt 420
 ttttcccca tactttaaaa acgtgtaatc tcctttgtgc atttcctgtt atatcaagtg 480
 tttgagttct aaagacagcc atttgttaga ttagcatgtt ttatgggatc attgtggaaa 540
 atgttcttac tgaagacaag caagttggca attttgcct cttttctttc tcacagtgtg 600
 ctttttcagc aaattgcttg gcagactgat catgactgaa tcatttcaat gaat 654

<210> 201

<211> 477

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 201

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gggctcgggt ttgacagatt caggaacaaa ggcacctgtg tcaaaccctc gtagctcagg      60
agtgacgcga ccttgctgta cttgaggaac aaaagccaag acagaggcac acggctgtat      120
tlcgggtgga cacagggtaa ccatctaata aagatggaag gcatgggtgtc ctagaagcac      180
actgtgatgt cctagaagca cgctgtgagt gttttggcca aaaccaaata gaggcggctg      240
ttcctatgcc tggatctgtg accccgacag ggccctgac ctcttcagnn nnnnnnnnnn      300
nnnnnnnagt ctcaggctcg gctttcctga ccacagagat ttacagaagc cccaaacgca      360
ccttgccctaa tttctaacta cggcttcata tagaccaggc atggaaagca agtgggaaac      420
atactctcct ctctccggtg tccacaggag acatcacaaa ttaatcatgg cactttc      477

```

<210> 202

<211> 432

<212> DNA

<213> Homo sapiens

<400> 202

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aatgctcttc taattagata tataatcctg aagggaacaa agatcatact ttgaaacaga      60
ggattttaat aggacagaga agcagcaaag atagaaatat ctactaaaga tattctagac      120
acctaaccat ttcattccca ctttaaaatt gaaagaataa aaacgtgtta aggaaatagc      180
ttaatcctgg ggaaggggtg gctttaaaag ctatagatcg taatttaaga aagcaaacaa      240
acatttcaag cacaccaagg gcattccaaa taccatgag ccactatcag ctttaagcaat      300
aaaacattac aaatacaact caagccctgc atgactcctc ccagattccc ttatccttca      360
tctgtcctca gaagtaacca ctatcctgaa tttggtgttg ggtttccacg tttaaataatt      420
tttacatggg ta                                          432

```


<210> 203

<211> 464

<212> DNA

<213> Homo sapiens

<400> 203

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gggctgaata aggatagcag acattgttgg ccaagacatt tttcaggaat ttaattttta      60
gcgcctgtgg tcaggacttg cacactccat ttcttagccc agtactcttc tttgttttat      120
gtgacctcaa ttacacattt attttctctg cctagctcct gaaggcattt gagtatatga      180
tcccatctca ttctgtgcat tgtggtctgc tcaagcttcc taaagcaaag catcttgccc      240
ctgctcaatt atcattgggt cctcttgcct gccatagaac ttaagcaagt attcgaaagc      300
acttctcagt ccaggtgggc ctgttcttcc cttgttatct tccattaccc tctgtaccca      360
ccttgctctc ccaacaaacc aatccccact ctgggccccg gattcacttg cagtgtcctt      420
cctaccacat ttctatgctc aactcttgcc tgtcctgcaa gtct                          464
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<210> 204

<211> 522

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 204

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ggttggaagg gttattgcag agaccatttt aaggtcaagc gactgccagg ttttcagaca      60
ggcagtgggt tgtttctgta cttatctgga taaccaagga gaacaatctc agggaggggtg      120
gctaaacagg aattcttttg cacctttcca cctcttttta tttctttctc tctccnnnn      180
nnnnnnnnnn nnnnnnnnnn nngggaagaa gaaaaaaaaa aaccctcttc tggccctgag      240
```

cctaaaatct cttacttgtg atgctaactt ttccctcgtg gcttcacgcc actgctattg 300
gctctatgcc tgtttaatat cgtgggttgct gatagcaggt tgtggctgtg tttccattat 360
aaagttcggc tttaaataagg tttctgagat ggagacacag ccttacaggc aaagggtcct 420
cactttacgc ctcgtcatcc aagtgtgggc caggggtctc aggcctgcat ctgcaaacgt 480
ctccgactta gccgaattta aacgtgctct ttggagctct tt 522

<210> 205

<211> 727

<212> DNA

<213> Homo sapiens

<400> 205

gggctccatc cctaaccacc attaggcttt cttcactaag agttaaacag aaacgaaccc 60
tttgaaaga cctgtaccac tccctgacact gccctgctct actgtgggtt ccataaaaca 120
accaactagc attcttttct gataagagac caccaaccat agagggattc tgtccagtca 180
caaatcccca tcttggttct tccctcctca aagtgtttgt ttctagcttc tgaccagagg 240
caatgcttcc caggctgtca gtatggcacc ctgcatgcaa caacccttaa tgagaaataa 300
acctcccctt tccaaatcta ggaacttcat tcttttagatg acagaagtta gcagagggtt 360
taaaggaaag aggtatatac agaatatgga aacattgtgt gggattgaat aaagtagaag 420
aaagtctcaa aacatattat taaaatggta actgttacat tttattgctg gtattaaaat 480
attaacataa ccatgagaaa agaagtatat gaactgcctg taaaagtctg aattagtgag 540
accacctttg gactagatgt aagcagcttt cagttttaac ctgagtttct aggctgggtta 600
ttttcttctt acttttatga tgtgattttt tttcttttat aaaataaaga cctaatatca 660
actccaaaat tacaaattct caaaggaaaa aatctaaaat ttgatgtcac atttaaaatt 720
gtatcca 727

<210> 206

<211> 661

<212> DNA

<213> Homo sapiens

<400> 206

ggggaaattg gtaaaattgt gagaggaatt tttagggcca atctcgtgaa cttggacaga 60

aggcagggaa agagagcaga gtatcgggcc ccttccttct aaactggtga ttttttttca 120
aaggcacaca ggcaataaga gccgggcact ttctgaaatg aaaaagaagg caactttgta 180
tgacagatta ggttaccctt ggatgagcaa tgaaattcta tgctaaaact gaataaaatt 240
catgatgcta aatcagatgt tttgcagcag tgttttgttt ctcaaacagg ctttcattgt 300
accaatcacc atgttcctgc aggtgggata atattttcaa aacactcgct ttaagaaaaa 360
atacaaaata aaaaaatatg aaagtgaggc tataactttg acaagaatca ctttgacagg 420
aacctgtgtc tgaccatgca agaccctccc tggcttcata ttttaaagca gattcgctgt 480
tcagatgtct cagtgggaca cagcctctaa cataaagaat aactgtcaca ctacctcatt 540
aatcatacat ccaatgatgt atcatgataa ttatgggtcat tgtaaatact ttgcttttgg 600
gaggaaatga gaaaagaaga aaaatgagca ggagactaca aaactaccag aatttagtac 660
a 661

<210> 207

<211> 655

<212> DNA

<213> Homo sapiens

<400> 207

ggggaatttg ggaaagtgtt tttcaaattc tcattttaaa atatgtatta ctcattcttt 60
gatgatttgt ccttccttat ggttacagat gttattacag aaattaagct atagtcggct 120
gattattata tagaaaaaat tgttctatgt aatatggttt aggttctcaa atttttcaaa 180
ctgaataata aatacttatt tgagactttg tggaaaaaat ataccttttc taaaactgta 240
aatctccatg ctacttcttg taaagtgtca aaggatacat gaaagtgcc taaaaatgat 300
gaaacatgca aatatttcta ttattatttc ttgacattaa ccacaaagct tcatcaggct 360
ctaaaactca gtgagattag gctttgtttt aattcttccc ctctccccta gtcacaggaa 420
aacatcaatt aaattgcatt gttaatctaa aatacttaca tgtgatgctg caaagtaggg 480
gaaaatgcct ttacttagat taagacacac agctttactc tgaggagct gttaaaaagg 540
aatgtatta tgcttggtgt tcatcaaaca aatcaacccc atcattacgg ccacatgtta 600
tttttgtatg gtaatgtcag ttagaagaca atgaaaaaat atgacaccat gaccg 655

<210> 208

<211> 412

<212> DNA

<213> Homo sapiens

<400> 208

gggagctggg gcgagagtca agtgggggca cctggaggcg gāgaggtagg aaccatcaca 60
tgaaaagaga aaagaaagga accagctgcc ttaaaacttg cctattagcc ttcctccctc 120
tccacctccc cactctcttt cgaggaccca ggagtcctgt ccccgagtc cttccctcct 180
ccagctctgg agaaggcatt aggcaggtac tagaagcaag aagtgggtca acctaaggaa 240
tgggaggagt ggtgtatagg acattagaga gagtctcca agtgggagga gggggtgact 300
gacggaggaa cccagaatag actccaatgc cccagctccc actgggccgg caccctaata 360
cagaggctac gcagcgtgtc tgccttcttt tatgttttat ttttattttt tg 412

<210> 209

<211> 403

<212> DNA

<213> Homo sapiens

<400> 209

gggaaaaacc taagaatatg ctaactcatc tgaatccatg taagaaacac aaacttgaac 60
aagaagggtga caagagagag aaatgcaagg gtcaacttaa gaggattatt aagaggtggc 120
aaccttgaag aaatgccgac tcctctgaaa gtacaacagt cattttcaga tgtttgaaat 180
cttgatcttc agatggagaa agcgtgtagt cagccatct ctattagtgc tttctctggg 240
acttcagaag cagccacctc atcctctcag ctgtttttct aatttgaaaa catggaaaag 300
gtcttcaata tttattcatg tgtgttcccc tttccttcac acagagattc tgaaaagcca 360
tcatgtcttg tccttacaag aacaggcaaa ggccagagtg ggt 403

<210> 210

<211> 557

<212> DNA

<213> Homo sapiens

<400> 210

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ggggctaaga gttgccaatg atggccggct caagggaccg gcctaaaggc cttgctgagc      60
caacaggaga catatgctaa acatggcaat agaaaatgag ttattgcttt acatgtgtta      120
gccttgctat gtacaaggga ataatgggta acactttttc cttttttttg cctgaatata      180
aagtcagcaa ggaagagaat actgagtgag aaaggatatt aattcttttc ttactgcttc      240
aaaatctttt ttttttagtt ctcatctcag tgaggaaaat atgcccagca acaatattag      300
acagaccctt gttggcctac gtaggctatg caaagctgtc aaaaatgata acacactaaa      360
gacaaaccac aagtgcctac caactctttt tagaaacaac agaaatattt gcttggaag      420
cttgagtgag tggagatgtt gaaatactaa agaaagtaaa tcccaaatg aaggttttaa      480
tagaaataaa gtgcgctggg catattttcc tctactgagat gggaactaaa aaaaaaaaaa      540
aaaaggcgcg ccttaat                                     557

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<210> 211

<211> 534

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 211

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gggagcatcc ctgctgaaat ggggtgtaac tccctatctc ttgttgacc aaatatttta      60
ttgctaccta tttttccatt gctataagtc tttgtgtgcc tatacattaa agaactttta      120
atagtgttaa tatcggaata catagttgat ttctaagtaa tatgctccag gtggcaagtt      180
aacacccatt tcagcaggga tgctnnnnnn nnnnnnnnnn nnnnnnagca ccggctgatg      240
tgaccgtctg tgaggggtat ccgcgcgctc ggcgttctgc tggattctgc tagacctctg      300
ttcccagcac caactctctt cagtgcctcc tacttacttc tcctcctaag aaaaacctgc      360
tctcaagaaa gggataaatt catttacttt gagattataa ggcttaatgc tacctctttt      420
gagggtcact tgctttttta caaggtataa accttaagcc ttggtcact gacctgtgtc      480

```

aagaacaatg aaactccacc actagttgga gaagtgtatt tttcaccatg gaaa 534

<210> 212

<211> 536

<212> DNA

<213> Homo sapiens

<400> 212

gggtgttttt aaataactga tttggcatta attaactgat ctcttccatt attaaccaga 60
atgtactatc tataaatatc ccaacttttt tctgatgagg aatttaatat gtacaagatg 120
ataacaaata tcttaccaca tttgacttaa acagaagatg ttgctcagtt aatatacctc 180
gtaaacattg gaattggcca cgtaagcaca gtaagctgtg ctgggggtttc gtgggttgga 240
aactgaccca gagtcaatta ctgaacaaga ggtaatttat tttttctttg ttaaaaattg 300
tttacaagt caacctaaac tggctgcgtg gaaaccattc agtaccata gcttttccct 360
ttgtcttgaa aaggaaaact gtcaaaacca gttttgtgaa gcaagttact ttcccagagt 420
tttctcacct tatcaataaa gattacaaat acttaataac aaaatgataa acttttacag 480
tccatttaaa aaatctatgt tagtaacaat atctgacact gtagttcact tatgaa 536

<210> 213

<211> 729

<212> DNA

<213> Homo sapiens

<400> 213

ggggggcttg gagaggggtga tgtttttagt ttttattgtg catattattg acggtggttt 60
ccttattcta atcctatctg ccttctgtct ttagggttct cacagtttct ggtccactgg 120
ggatacttct tgttttccgg tgctttcata gttgcattct gggatttgga gtgggaggag 180
gtgggtggaca ctcatgctgt ttggcctctg ggtcctggtc ttcctctcct cagcactcat 240
cagactgcac taagatgatt ccgagactac ccagaattag tgaacgtag gaacatgtca 300
gaagaaggat ggaactggga gagtttgtcc tacaaggcaa aagactctga ggagaaaaag 360
aaatattgaa aagggtgata catgaagaac tagactctaa ttctgctaga actccaacca 420
gggggacctc caaggggaag acacatgcag ttgatctaaa ttgatgatga tgggtggcgtg 480

tccttttata gacagggagt tccctgtcac tggagcttta ggagaaatca ggtgaccgct	540
tggcaagagt attgacgtgg aagaaagctc aggttcagat gtgttttcga ctggagggtt	600
atccaactgt ttattttaaaa tatgggtcca aaactgctct ggctgttgga aatatcgaga	660
tgaacaacgt aaggcctctg ccctctagaa gatcccaatc tacctgataa tgatggcact	720
gatgcttgc	729

<210> 214

<211> 676

<212> DNA

<213> Homo sapiens

<400> 214

cttcgcccc gcgcgcgcgc ggcctcttcgc tcaccctccc ccatttcctg aaggacaacg	60
gctctatttt actgggggtcc gccatcgtct cgtccgcgcg tcttggtctt tcttgtaagc	120
cggtagtttt cctctccact tttgatgact cgtcattgct agcagtagcc tttcctcttc	180
atagcggagt gatctttccc ccaacacgac ggtcttagtc gggctcctga attcctctt	240
gtcccccttc acctctctcc ctttcccaat tttgccccct gaggcctcct cgccaccact	300
gtggccttcc gactggcgta gcttgaagtc tcggcttccc ttcattttgt ggtcatgacc	360
gtggcctaag tgaagtgaag ggcattttcc tgcccttctt ctagaaaata cacggtacct	420
attaacctct tcagctcaga gcctgtggtg acgaccgtcc tactccttga gagattccca	480
agagatccgt ctttttagca gagcgaggaa agcaaacact tactcaagat gaccctaggg	540
gagccgtaac ttggctggtc taaggggggtg cggtctgaat caggaacagt ttctcaaagt	600
gtttttattht atttcccaga atgtaatcct ttcgaaacaa ttttgtcaca actgaatttt	660
caaaagaatg aatctg	676

<210> 215

<211> 558

<212> DNA

<213> Homo sapiens

<400> 215

ctagaattat aaaccttact ggatgggtga gcatttggag catacctttc aaattcatta	60
ctgaaagtat gtataaagaa gtttacatca gcccttgatg tttgctagtt tatttgtgca	120

acagaccaaa tggatatgct atgttactca atttgtggcc ttaatagctt tatttttcaa 180
 aggcaactggt tgtagaacat aaactataat aaggtcagca gcagttagtg tggcaccact 240
 aacgatataa tatgaaaaag gggccttctc caaatgatta caggatacga aattcttgcc 300
 tgtaactgct ggtccaagtt ctcaccttcc tgaatgacta ctataatttt tcccccaaaa 360
 attgctcata tatatgctta gggtgacctg aacgactatt ctacttaatt tatttacatt 420
 ttattaagac aatgcaataa attaggtcta aatattgtta ggatcacaaa tattacatgt 480
 aaaacattta gataaaatga gattatttcc aattagggga atgtcctttg atccttcact 540
 tatgttttgg aagcagtg 558

<210> 216

<211> 704

<212> DNA

<213> Homo sapiens

<400> 216
 gggaaggcgt ggagctaagc cccaagaata ctatctgcct tcaggggtgc acgttttcta 60
 accgaaactg ggccaagact ggaaaaagcc acaggagctg cctcatggcg gatgtagaac 120
 tcactgattt attggacttt tccacatcta ggcctgcccc aagattctga cctgctagta 180
 acctgggcag aaccagaag gttcctataa gtcagactcc aaaggccagt tctttcaaac 240
 tgctcatctg taggaggata catgtgtctg aaacttattt aatattctac aaacacaaac 300
 cgttcgccta tacatagtcc attctgcaga tagtgttact gatgaccaat agaccccgag 360
 tgctttaatc aatgaaatta ctgcctcggc tattacagga gactatgaac tgttgcaatc 420
 ttctatccac atttcaatcg atgtaaacca gggcaagaaa aaaacaggac ccttaattat 480
 ataaccggga aggattatat aacaaaggtc ctgatgcagc tttaactgtc tccgtgccta 540
 cgcgggctga aagagcacac gttttcagag ggaacatgag cagcccagag ttgtgcaaac 600
 catttttcaa tattggttta actaatccca cttactcacc atcgacaagt cctctgctct 660
 tctaaccctg tttttccaca gccctggatg gagcaacccc attt 704

<210> 217

<211> 501

<212> DNA

<213> Homo sapiens

<400> 217

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ggggaagtgg taaggaagga ggctggagca aaaggagaga ggacgatgga tgccacaggg      60
ccagaactct gaatttaa at gctagactct ttgccacaaa gcgtaatgtg tatgtccctt      120
tggaagcat ttaagtttta cagttaaaac ctttaaaaat atttcatata ctcttgctcc      180
ctcattcctg ggaacttgtc cttaggcaag aaagagagaa aaagaacatg aataggactg      240
ctctttgtag cattgtttat ttattttatc tttttgatgg ccctcaggct cacagatttg      300
aattaatcat aatattta at tcatgagaca ctttcatcat tggtcgatgc atgaccctct      360
gtaatttaac atatttcttt taataaatat gttaatgtaa tagacacca tgaaccagt      420
acccaaatat aagaattgaa aagacagtat tcagaagggg gagcatagaa agaaatctaa      480
aaataaatgg aacttaagt t                                     501
```

<210> 218

<211> 591

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 218

```
gggggtaa acgggagcag agtgaggaca cctaacacat atctgtttgg agtttcagaa      60
gagctaatat ttgaaagctg acagggtttt ccagaatttt ggaaagatgc tccttctcag      120
atccaggaag cctggtgaat cctcagcaag ataaatcaaa gaaatcccca cctggacata      180
tcatcaggaa actgcagaac accagaggaa gaaaatacct taaataaacc tacagagaac      240
aggccattca ttacaaagaa atggcaacta aatggatagc taacttattg acagcaacag      300
tagatgtctg agtggcatag agtcttcagt gtgctgcaag aaaaacacag tcaactagaa      360
```

agccattgct agcaaaatca tctttcttcc aagaattgnn nnnnnnnnnn nnnnnnnnnn 420
 nnnnnnnnng gaaacaacaa cagcaacaaa aactgccaac ccccagaatt ctgtattcag 480
 tgaaagtgtt cttgaagagt aaagttgaaa ggatgacatc tgttaataaa acactaagag 540
 aatttgttgc cagcacatct gtaccacaga aatgttaaga gaagttcttc a 591

<210> 219

<211> 617

<212> DNA

<213> Homo sapiens

<400> 219
 ggggtggggg ctgggggaga agctaatac taacattgtg ggcaagaagt actcaagggt 60
 aacaaagggt aatcctttgc ttttggctga aatgttatca gttcaatatg attttcacta 120
 caccttcatg attaggagat atgatgtatc tggttaattt tttttaatag aagtaattta 180
 atgcttattt aatacagctt gctggacaaa atttttcaca aggaattcat ccaagaaaat 240
 gaaataataa aagggtcat gatgttgaga aggttgggaa ccaggacttg aggaatttac 300
 agcacaagtc ctcatggagc ccagaaccag atacaaatca catctggtgg tccctctgag 360
 gatggcaagg caggtggcaa ggcttcaggt ggtgtgcaag gggcaaaagg gcagcgtggc 420
 caggtagtct ctgtcagcac taaactgatg acaggggaat ggggagaaga ggacaggcag 480
 ggcttcaagt atggggccca tgtgattccc agctgaacac caagattaaa aaaaaaatac 540
 ataaataaac accagctgct gtagtcagag ttgccaattc ttctcttctt cccatttget 600
 gctgcactga gtcacca 617

<210> 220

<211> 628

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 220

```

gggaagggat agtcataaac atagggcggt gtttgtttga aaatgtctaa gttgaaaatt    60
gtgtgcatac tgatgaatca tgtaaagtac tcatggatat ttgaaagaga acgtgacnnn    120
nnnnnnnnnn nnnnnnnnnc atcgctacaa atgtagnnnn nnnnnnnnnn nnnnnnnnnn    180
nnnnnnnnnn nngtagataa aatacactca tttatatattt acagaaagag ttttagagtt    240
ctgtttttaga catgtaagtt cttaatctat ttgaagttga ctttttaatg tggcttgaga    300
taatgacca attttatctt gtcaatatag aaaaccattt tttgtggcct gaagcacagt    360
ggctcatgcc tgaatacctt cttaataatg cataaaacat gtactaccac gtaagaatta    420
taacagcctt taaaagaaag gaaggatcaa cttgcttttt acctggcata tctgcttgat    480
caatttgagc cattgttatt aaatgtctgt tgatcagctc ctatgaaaca gaaataagta    540
tatttttatt taaacacaga ttctgaaacc tggaattcct attataatta aataacctaa    600
gtattaatat ttttggcata tgcacttt                                     628

```

<210> 221

<211> 486

<212> DNA

<213> Homo sapiens

<400> 221

```

tgggggtgtag aaaagatgct agtttttcta tctgggtaag taaaatttaa atatatgttt    60
tattcagtat gaaatgaaat gatatgtaag aaggtagcct caaaaagtga aaaagcagct    120
gtataagatt atttcacatg actttatgaa tgataccttt tcaatgaaag caaatgatcc    180
agggactctt aggaattaag actgttattt ctcttttttt attgcttatt atagcatcac    240
ccaaaatgga aacaatgaat tagcattaac tgatctaatt ctttattaat caatatatta    300
agaaaatatt gcattaaaat aacatctaaa gttataatac catactattt aacttttctt    360
taggtatttc caaaattaat aaactcaatt atacataggt gttacatgtc aaaattagcc    420
atggtaactc tcacttctat aatctgacct ttctaaaaac ctgaaaatca aaagtttatc    480
ttgaat                                     486

```

<210> 222

<211> 568

<212> DNA

<213> Homo sapiens

<400> 222

```
gggtctgaaa cttgttcaac tgtaaatact tagtcatcat gatgcgcgcc gcttaacatc      60
acaagatact aatgatttaa ctctcataat caaggaatta ttttatcaag tagaacatat      120
cactatatta gaaaggtctc catatatcaa aaaatatgta aacttttata atgaaatatt      180
tgagttttac attactggtc attagagcct taaggcttgt tcaatttcat ttcttggtat      240
cactcagtag tcaaggagaa ggaagcatca aatgtttaag aaaaaaacac taagaactt      300
acattcaaca tatatcgaca aactttttaa aaactgaatt ggaaagttgc cataaccagt      360
ttcagtgaag gaaaacctca agtcagcccc cataataatg gtgttttcca ggaaattagg      420
tttagggtaa gtggtctggt agaaattctg aaaacatttt tcctcttttt aaaaaacagg      480
tcacagtaaa aattaatggc ttccttcaag taccagtag actcctatat acatgtaggt      540
agaccaaaaa ttaccagtga gctccaat                                         568
```

<210> 223

<211> 506

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 223

```
ttaaagtaag tcaatacata agtgttgcca tttacagaaa tatatgcatg atatccaatc      60
tgtcatgtga tgtccatttc tgtaagtaag gacaaccaag tccaacaaga caaagagcca      120
```

```

aaaaacttac gttagattgt taaggactcc aactttcctt cagataggac tcacctcttt      180
tcatagaatc atgactatctt aaggattaga taacctatat agcctattaa aagttatcct      240
ctgaatgtct gaatgctggt tacaacatcc tggccaatag ggtcaatgca caaacctggg      300
caacctcaag gacagaagac ttgcttaatt ttttctatcc atttgtcatc tttgaaaagc      360
cgnnnnnnnn nnnnnnnnnn nnnnnngtgt ttccttaaga gttatgagtt atactctgaa      420
tctaacttac aaactccaaa tctatctttt taactgatag atttataata aaagtataat      480
catatgcaca cagacacact cacaca                                           506

```

<210> 224

<211> 515

<212> DNA

<213> Homo sapiens

<400> 224

```

ggggaatgcc tgtgctaaag gggtcagtgc catgggaatg aggaatggag aggatcccag      60
gaagcacagg aggcaacaca agtcaatgcc tcagagccag ggaacaggat gaacaagaac      120
aatcagaaga tgaccttgag ctaaataaag caattgcagc aggtgggtgt ggggtgaacat      180
cagaccacgt cgaggtgagg aggtgggaaa gtggagatgt cattctctcc cggaaaattt      240
ggcagtgcag agacggacag agattggata agaacttgaa agaggaacag ggttgaaaaa      300
tattgtttta ggaaaggaat gatttttgta tatttttagg ctgaagagag agatgggggt      360
gggggaggat gcgaatagca tgaagtgta agggataaaa gatgtatttt tataaatttt      420
ttgatgtctc tcttcttcat cagagcaggg attcagaaca atgtgacttc tttccagtct      480
taaatttaga acaactcaac gactcctctc aattc                                           515

```

<210> 225

<211> 662

<212> DNA

<213> Homo sapiens

<400> 225

```

ggggctggtg ttccaaatgc caaatgaaga aaggctttca.aaaatgagtg gtcaacagta      60
tcaaatgctg ttgagaggtc aagtatggta caagagacca aaggatgtag caatccttaa      120
atcagttttg accttacaag gagtgatttt agtgggatgg taaggatgaa ggccagacta      180

```

gagtggcttc aagaaagaaa caaaggtaaa aaagaagcaa tgataccaca cgaactcttg 240
 cagaatattt tacagtatca gggaggagat aaatgaagca gtagacagta ggaatgtggg 300
 atcaaaaaca ttttttaaac atgaaatctt actgtaggta ttctaaaagg gaatgatcca 360
 gaagaaagta gaaaactgat gatgtcagag aaacaacaat ttacgaagac aaagtctttg 420
 agactgtgaa aggagatgga atccacacac aaggaagggg tgactggcca taagggcaaa 480
 gacagtgcac ccactgtata agaaaaagggt gagcacatgg acaaaaatga aggtaggtta 540
 attttttggg ggaaatacaa attctcttcc ctctaatacat tatttcatag gggaaaaaag 600
 aaacaatgtc tgtttaagac tgggaacaat ttaaaaagta ctcacacgct tcaccattga 660
 ga 662

<210> 226

<211> 727

<212> DNA

<213> Homo sapiens

<400> 226

ggggtggtca aagagttgac aagatgaagt ttccctttct aaaagtatcc catagatgta 60
 aataagcata gagataaatg aaagaggaat aacaggatta gaatatcacc actgtgcatt 120
 gtctaataca ctaatggctc ttgacaataa tcatcaacag gtaacatcac agaaagagac 180
 aagcagcaac tagacagtgt gtcctcctgc taaaagtacg taacgtcagt tgtgaagtag 240
 tcctgtccct ctcacccaga aaaagcgccc gactctgacg aagctttcag gaaatctaac 300
 taccaaggta cacgaaatac agaaacagaa gagcacgtta aatgacacca caggcatggt 360
 tgttttctaac ttgggtttttt agttctaacc tgtcactatt ttaaaaattg tattgataaa 420
 tacaataaaa atacattaga aaagagaaaa atacttataa aatataagcc ccaatttttt 480
 attcatagat tcaaaagaca taaaagtaca ttctaattag aaaaaaaga acaagaaaaa 540
 aaattaggaa agctatacac attatttatc gaaggtgcaa atacagacaa ttattagaaa 600
 attcctatta tactcacaac tttctgttat tctgcagtca taactaggta aagttatgag 660
 actccataag aaaactacat ataagatata tataaaacta tatatatata tctctatgaa 720
 aactata 727

<210> 227

<211> 690

<212> DNA

<213> Homo sapiens

<400> 227

```

gggtatctga gaaatgcttt ggoggggtgct gacaaggctg gcccgagct gagagacagg      60
ttgggctggg ggacagatc caggagagag ccttctaaag gacgccactc atcagacgcc      120
tgaagttacc aatgcctgag actgtccaca ggtggggaag accgggccat ccttcaggag      180
acaagaaggc aaaccacgt aagtgaagga gaatctgcaa agcacacagg tactgcagta      240
aagctctgct gcacaagact ccattgcatt tgctgaataa ttcacactgt gtatcacagc      300
tctgcacgca gcccaaccata gaaacacaac tgcataacg cagatcattt gtagattcca      360
gatcttcagt aatattttatt cagatttcca cttatcctgt aaatcaccag ttctctcctt      420
caaaaattga ccactaattt ttacaaagtt tacaaaaata tttgtgacta aatatgcttt      480
aagtttaaag taataaaaga ctagtattag ttaccctctc ctcaaagtat gataaaaatt      540
attcactttg aacttatgaa atgtcagaat cttcagttga acacaattat tgtgacagaa      600
aattctatcc agtgggctaa tccagaactt tccaatcatt aatcacataa ttacataaac      660
taacctgtga ttaatttatg taattaaata                                     690

```

<210> 228

<211> 431

<212> DNA

<213> Homo sapiens

<400> 228

```

ggggggagtg ctcagagcca ccttagcgca aagtgctaac ttttgaattg aggcagtgcc      60
aggggacgca gtatccgcat cgcacttaca ttttaactcg ctgtgaaatg agaacgcaaa      120
gacgatttag gttttattgt ttccgactta tatttttccg aggtctttga tttacgggaa      180
attgttacgt actaaatctc atatagcaag agatttagaa aaggaagcta cagaatctag      240
gctaattgtat ctaatagcat ttcttgcttt tgctcttttt ctttgccctt ttcccctact      300
ctaagaagtt catattcaac tgaaaagcca tgaaaattac cgcttttgtc cctccttgat      360
ataacaaact gctttcagaa accgtacaag atagtacta agggaagtca cagttcaaatt      420
gagagtggca t                                     431

```

<210> 229

<211> 708

<212> DNA

<213> Homo sapiens

<400> 229

```
gggggttgcc gagtggtaaa aaagatgttt gaataaacag gaagtactgt gcggtgaag      60
cacactcgaa gagaaaacac actggaacat tgccctttgt aggcaacctc agggagggtt      120
gcctccacag tagctggctg ggctctcact aaatgacaaa gaaaccacaa gaattcctca      180
agtaattctt cactttcaaa gttgaaagat cagttggagc ttgcaggtaa ttttcaaagt      240
tgcatttagc acttaaagaa atctattaat gccacacata tctaaaccgc tccaggctctg      300
caagcagcga cacagcacac gcagtgcgcc ctggctagac caagccctag ccaaacacag      360
ctcattcacg cagacaaata cacaccaaca gggtttcggg aaacctgctc ttgagatatt      420
tttgtggtga catttacata ggcaggatgc tttaaagaa aaaaaaaga agaagaagaa      480
aattcagatt ttgcagactt tagaggattt tgcacatgt atttttaag aacacatcgt      540
cccgatttcc agggatatgc cctggatctg gctttgactg gctgtccttt acattttctt      600
tctccaccat caaccaaact acctgtttat ctccagatgc ctagcttgcc taatggaaca      660
ctccttaacc cgccccaaaa tgattgtcac agtcctgtct tccgtcac                      708
```

<210> 230

<211> 569

<212> DNA

<213> Homo sapiens

<400> 230

```
gggaaagctc ttgtccatcc tcctcttgcc acctgagggc agggagaggt gcccaagcgc      60
gaatgtgcag gaaactcccg ggggtgcacc tgggacctag gaagccaggt ctggaaaggg      120
cctatgaatt ctcaagtgtc gcggatgcag ggggggtcca ggtcagagac actgcatctg      180
ttggtgtcta gcctccttcc gtctgtctgc gtgtgctttt tcgtcttgct cagaactgat      240
gccctgtttt tgctcctact tgcttggtcc tctgtggaga aggggtttta aaatggctta      300
taggggtgctg gaagttgtgg ggtgattatg tagggagaaa aaaggaaaac aactaaaacc      360
agtatgaaaa agcttccccca aagaggagat agtatgtaga aaagcccat tttcctttta      420
```

tttaaataatc ctaaataatat cacgaaggaa catacactgc actttaatgg taaaaagata 480
 caagtttata acatcttata aaaactacca tttaaagtg atcttggtcca ttgatattc 540
 ccctcccca tagcaaaata ttattcaaa 569

<210> 231

<211> 517

<212> DNA

<213> Homo sapiens

<400> 231

gggaattcca atcaaggctt actcatgttt ttaactacat ggtctaacac caaactaagc 60
 accctgaata atataatgca tgctgtcgag aaatgctatt gtgaaaatga ataggagaga 120
 aaagagccat aatacagatg cccaaatgag tgctacaaga ggggcaaaag tgtgaaataa 180
 aagcaggccg ggtggtgtca aattctgtat gatgtgtggg ttgaggaggt agagcaggga 240
 gtctggcctc tgaggaggca aaaaaatcga actcactcaa acttgttttc tgagcgaatc 300
 ttcaatttgt ctaagacttt tccctggagt taggaatttg ccaaaaaatt atcagcacct 360
 attaggtgcc aatatagtat agacatggac cctgtcttca tgaagggcac agtctagcag 420
 aaaaagtagg gcagctttca aagatgggtc tgtaatatatt tctgcttcac actcttctgc 480
 agtgcaactt tgccattctc acattaagag atggggt 517

<210> 232

<211> 485

<212> DNA

<213> Homo sapiens

<400> 232

aggccttagg gtactttatt tttcaaacct aatctgtctt ttgttgctt tcacacaagc 60
 aaaacaaatt aacttgttca cagcctttct tctgcaaatc tatatagata tccctttaat 120
 tacttttggc aatttatcat tgccaaaaaa gctaaaacca caggaatttt tattcctttc 180
 taggtaaacg gtttctacca tctggatgct tggatgctta aaggacttgt tgctgttttt 240
 ctttactcct gatgggtata tgtatgaata gcttttcttt gattgtgttt tgaatacagt 300
 ggacctttgc acttgcgtag ttacgtaaaa ctgccgctca ggagagtctc tttaattatg 360

ccctcaacca ttgtttccaa acaattatcc tgctttcttc ctaaggggct tcaatcattc 420
tcagggttga tctctgaccc ctgtcttaca tagatcattc tctctttcta tttaatctct 480
ttgtg 485

<210> 233

<211> 724

<212> DNA

<213> Homo sapiens

<400> 233
gggggagcgg gggcgcgcgcg acccgcgcgc gtccttctgc tcttccttcc caccgcgcg 60
gtgcgcctc gtgcgcctcg cctgagcgtc tcccagcccc attgtttctt catcagcctc 120
cttcgggttt cagtaaacgc ctggttcctt gcatccagat ccttggtatc cctccgggct 180
gcctccctgg aagggatccc ccacttcctt tgctccacta gctgcttccc ccaccccttc 240
ctggctttct gttccacctt cctcctgct tttgggttac cttttcatcg cctctatagt 300
agcttcagtg tagtttcttc gactcatttt aaataccata ccagttacc cgacttttat 360
ttcagattac cttctttgtg ggagtgaag taaaaggatt caatttgggt tagggaaagc 420
tttctggaaa gttgggattt ttatttgcct ctggtggaat ttaatcattg tgttgtccat 480
acttttgact ggggtgagtt tgtgactgtc agctctgccc ccagctttt cacatgggga 540
tatggaaaaa ggcattttgc tgatactctt ttatcagttc ctggaactgt taattctggc 600
ggcttgaatt cagaagcttg agtggttaag gtagactgtt ggaattccaa atggattaat 660
aaatttactt acaaataaca tacatccctt aaaaaaatgg caaatgatg tttgatgatg 720
cttg 724

<210> 234

<211> 623

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 234

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ggggggggggg atttgataac ttgtctccaa gatatactg ttttacgtgt atgtgcatgg      60
tccatttaaa ggtggggatc ccacttcccc agccgatccc tcccaacctt ggctcctcga      120
taagtttctt aaagtgctaa catctggggg aggaggagag tgcgtcagtg tttgacggcc      180
ccgccgccct tgggtgcctc ttctgcctct gccgcacctg tcagccctgc gactgccccca      240
cagtcactgc tttgtggaca ggtacatgtg gtcaaacagt aggtgaagga caaagcccag      300
gaaggccaga ctgcacaggt gcagcaagga gtgaggcctg ggggtgacac actgcctgtg      360
ttcctgcttg agctgtcttt ccctgtgaca acagaaagcg tctagaacaa gtgctctctg      420
agcctcagat aggagcctgg cagnnnnnnn nnnnnnnnnn nnnnnccttt ggtcagtgc      480
tcatagctga cttgagcagt tactaaaaaa actccaacta atttctgaag gagggccctg      540
gggtgaagca ggccacagga cagtgaacaa ggtgtcctgg cttctggact ccaggagcga      600
gagggtgagt cccccagcac ccg                                           623

```

<210> 235

<211> 555

<212> DNA

<213> Homo sapiens

<400> 235

```

gtgtgggtcca tctgcagaga aaagtagagg tacaagtgag ggttctgtgg agtgcaaaga      60
agtccccacg ctcaggatcc ccateccagt ccagccacca cacctggcac ttgatgcctg      120
ccaggctgca gctgcaggtc tcagggtcgc agatcctatc gcagtgcag ccacaatcct      180
cccgggattg gcgcagtgcc tgcagctccc gcttctcctc ccgatcgatc cttcgcacac      240
ctgaagccct cagcagagct cgacgtcgcc gggctgggta gggctgtagg aagctcactt      300
cttccaaccg gccacctgcc acagcgactg ccaagtcctc ctccacagag gcgtcatcaa      360
tggcatccac cacagatggc agccctgcct ctgcctgggg taccacagct gccgaaagct      420
gcatccacag gaaagagggg tgtgagaagc acagacatgg acatgggctt agccctactg      480
tcactagaca aaccctcacc aagtgttac cccgccacta ctcggtgctta atctgcgatg      540

```

ggcactgtgt gtcag

555

<210> 236

<211> 598

<212> DNA

<213> Homo sapiens

<400> 236

ggggtgtttg ggggagcaga agaggaagat agaagattgt atctctctat cttcttgtct	60
tggcttctga acccgagatg ttttttatta ttgcaggaaa agacagaagc tgattgaggt	120
cccagcttgg taacagtttg aagagttgca ggactggctg gatgagtact ggctgcagca	180
aatcaggctg ccaggattct ttatggctgt ttctgcttcc actacagctg agtcagaaag	240
gtcgctgccc cgtggtggca ctagacgcag tggatctggc aagcaaagt ttccgctatt	300
agctctcggc aacagagact catatatggt caccttgga atctgggctt atcgatctac	360
agcccaagtc tgctgagaag ctggagctta cttaaagggga aacctgagag ctgttcaagc	420
cccaaattatt ttccacttct gcgtcacctc tgctgtctgt tagcagagtg gaggagaaaa	480
tacacagcac aaacaacgtg aaaaaatagt tactctattc attaaaagct gtaacttcca	540
gattggactt gagaagcaat taagcaacag aggaacctca tctactatct gtattcag	598

<210> 237

<211> 771

<212> DNA

<213> Homo sapiens

<400> 237

ggggactctg cagcctcctg ggaatgttgg tgctgggtat tggatgcaag agtgtaggca	60
aacgaaggca gaaggaagtg cactcatgct agcccaatcc tgcattatth ccccatga	120
tcacactcta tagcaaccct gtgagagaac agtgtatcag ctctttttt caggtaagga	180
acctggtttc agaagagtgg agtaatccac ccaagtcctt caggcagcag ggaaggaata	240
gaaccaagac tcaaattctt atgacttcaa aatgcatact cttttcttac cctacccac	300
cctagtacat atctatcacc cctcatagaa acaactcatg tttatctcca ccaacagagg	360
gaaaatcgca ttatgtttta ctctgaatta tgaaagagat catcagaata aatatcactt	420
tctatcaaaa agtatthtta aggccccagt caatggctgt ctactttaag gtgcattcaa	480

caccacattt ctagcataaa gaacaaattt gacttactcg tgatggagtg ttctgccgtg 540
ttttcaggct agcacatttc ggtgatcatt acttaggtgg attcttttaa tctaaaacaa 600
ctcagtttta gaatcatgtg tttaattcat gcccaagaac catatcttgt ctcaaggtag 660
aagtgtagtt tcggttacag tgaaactcag gaaaaaacat tgaagcagct ttagtgtttt 720
taaaatacca tgctgagtga ctcatatct ttgatcacac ttgctgaaat t 771

<210> 238

<211> 644

<212> DNA

<213> Homo sapiens

<400> 238

gggagggggt cctgggattt cgggcaggga accgggcaca cgtgaggggt cctgggtagg 60
cgcttacgtt cctggtagag ggttctgggt tcgaggetgc aagcccactc accccgggtcc 120
tgagagactag ggaagcatct gtgctggctt ttgtgtggag ctcaaggaga agctgggctg 180
ccctttctcc cgcctttccc tccctctccc ttgctcccgc agcagctcca tgggtgtcag 240
cgggcagcac gggcgctgc aggaagtcag gcgaggggtga accgaagtgc tgggggtttc 300
taggagggag atcgggctcc ggggttccag gtccctctta atccatcttc ttgaacgagt 360
aatgtgaaca acatcccaca gggcctctgg tgaggacacc gtggctcgaa agggacctga 420
agctccctgc ggaggggaag ggagaacaag gaggcagtga catgccgcca ctgtggtctt 480
cccttccgtc tttccctgct ggttggcagc cccgctgtac tccttaggga ggcctttccc 540
tcttagcacc ttcacgtctc acctggctgc gtggcgtttg cacctgagca cgcgggtaga 600
actcgggtctg tgtctgtgca gattatgccg acaagcccct ggag 644

<210> 239

<211> 522

<212> DNA

<213> Homo sapiens

<400> 239

gggatattaa atgactgatt ttaaattggat gatttaaaag tatcatctat cctaacagat 60
gatacttttc ttgaacaggg acaaacaaaa taagatgtca ccttcatata aatgtttcat 120

gaatcaaaca ggcaacaggc taatccagca gaccccaaac ggacagacaa ggtttgaaag 180
gatccctcat caaaattata acagtgttta gtttctccag ttactacca aatttattta 240
ctccagggtta ccattttcaa atatatataa ggctcttagg agtaatctag atatgacttt 300
ttaaacacca ttaactgcat tcatggtagc catttgtcat tattttttca ataaaagaat 360
agtaaaattt acttcctgca ggggcaaagg ttgactctgg cataaaaagg gattttcata 420
ctcgatgact gaagtgtcc atatttgtaa ccaagtagaa actagacaaa aatgagaatt 480
attatgaaat ctttccaaat taaatatgag tgtttgaggg aa 522

<210> 240

<211> 554

<212> DNA

<213> Homo sapiens

<400> 240

gggagagcgg tccagtgcc tgcataggag acgaggaaag cagccagagc cggcacaggg 60
cttggccaaa gccacacagt tgtttggggc ctctggggca taaatcctca agtgctggca 120
agagatcatg ctaaagagag aagaccccag gctgtgtgga gggagtgggg acagcagggc 180
tatectaggt ctagcctgac atcataaggc tgctcagccc tcttaggcac ccacctcca 240
gtcgctccct gagcagggcg tccccttctg tcttgacctg tgccatccca gacattcctg 300
agcacccctac accatgctcc ataagcgggg ggaggggctg tccagggaac ccctaccaac 360
tgcattttta agtctacagg aggattttac ttttttaatt ttgaaattta attttcttta 420
gagttagggg catgctctgt cagttcctac atggcaaacc agagctgagg cagccacccc 480
gaggccataa tgtcttttca tccaagtcac gatgatctaa tgtaattata aaattattaa 540
aagaagtact aatc 554

<210> 241

<211> 538

<212> DNA

<213> Homo sapiens

<400> 241

gggatagcct atggaaagaa gggactacat gtgagtatgt aatagttacg attgccatag 60
cgtctacatg acctgacaca gaccagggtt ttgctagaac tgctactgtt cattgacct 120

tgatgggatg tggagtggta tctatcattc cagttcacag atgagaaaat ggcagctagt 180
aagtgggtgga ctggggattt ccacccagat cttctgaagt caactttgat gaactggata 240
gactaagaaa agcatgagac cctgcttgct ttcctaagag atattcaatg gtccaagtgg 300
agactgggca tcaatagtgc agtaggactt agagtttgag ttcctttcac aattattaaa 360
ggttggtgaa agaacaaaag gtttttttta ggcatgtaaa atttatcttt atttgttata 420
ttttatactt tttgcatatg gcgtaatatc tttgtagctg taatcaaatt attcccctta 480
tttctctgag gaaggctgga gaaggactat aataatcata ttttacacaa acaaaggt 538

<210> 242

<211> 477

<212> DNA

<213> Homo sapiens

<400> 242

gggggtaggg gtgggatgct ggcctttccc tggagagcag gcaggaccca tacgtagaag 60
tgacaagcaa ggtgaccaaa gctaaggacc cacaggtcta aggagcaggc acatcgccag 120
ggcagggagt gcccgcccat cactgagacg gcgaagagac gcacacaggg ccctttcctg 180
tgtccacagc tgtccctaac aagggccttg cagaaggtgg aggtcactct ccaaagaagc 240
atctccaact actcttgggc aaggccatct ctccagtagt cttacgcatg aggctaaacc 300
tcttctctta cctcaaagat ggcttcagta tccctcccgt tacctccaac agggcaagaa 360
atgtaccaaa agcaacacac aggaggccac agtggggctg agaggaccca ggtacacatg 420
ctgtttcctg cctggtttct cccacctct gccgtgtgtc tcaacgctcc tcctgga 477

<210> 243

<211> 416

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 243
ggggcccaca ttcttggcaa ctaggttgag tctggaatgt tgggtggctg tcaaacatgt 60
tttggctgga attcagtga gcagagtcac ttcacgtctt gtgatctttt attgaagaac 120
actttacatt ctctgccacc tcccacatat ctgatctctn nnnnnnnnnn nnnnnnnnnn 180
nnncttatct ggggatcact ctccctgtgt tctagggctt gtactcaggg ataacttcaa 240
agtctgaaat gtcttaagta gtaattaaga aggaaaacaa acgaactaag tgtttgaagc 300
agacattttt ggggggaaag aaaaatacca tcaacagtcc tatagaaaga ggaacaatgg 360
ctttaagaaa aaaaaagaag aataaatgag tcagaaatag agaagaaaaa aatatt 416

<210> 244

<211> 516

<212> DNA

<213> Homo sapiens

<400> 244
gggatcttta atgggcttcc ctgggcagaa gcactgcaca cgttgctgca ctgtccttgc 60
tgggggaaac aatgtgctgt gtgaccactc atggaaggga cagagcatag tgacacctgc 120
acatggattc ctctattctc tgtgtgtgtc ttttcccttt ataacttagc tgtgtgtctt 180
tattacctta gccaaacata ttaactatac accaagtccc ctgagttctt ctagtgagtg 240
tctgaatgtg agaggccatc ttgaggacct ttgatatgca cacctaaaat gtaagggcct 300
cagtttatta ctctgtccct agtgcttaca tcattatcta gtacacagct gggttattgca 360
actatctatt gaaaataagt ttattttctt tcatttggct tcttccatta ttcctaattg 420
aacagagaag agtatcagtg aatggacggt ggacttttag aagcttttta caatgcacct 480
tgctatccaa cttataatct gcatgcctgt gtgtat 516

<210> 245

<211> 535

<212> DNA

<213> Homo sapiens

<400> 245

gggaacttaa attatttcga acttcattcg ggataactgc aaagactatg gtatactgag	60
aacttctact gccagatatt atgtaaaaaa ttacaattat taaaacacca tatttcacca	120
aatctaagac actgttgatt gtgacacttc actgttatgt accataaaaa gatgcccaga	180
aagggagtct caaaggagaa cccctcacia aaagtggggg actaaacatc tatagtctca	240
atgagggata aaagcaagca actacatgca gaagggatgg caaagaggcc tgcgcacctc	300
ttccttgaca atggaaagag ggaacaaaaa ctccaatatc tgaactgaca accccatccc	360
tgcaaatttt gggggctgaa atcacactac cagcatcatc ctaaaaaatc ccaagcagag	420
aaattagctt aagcagaggc aagttggtaa agcccctccc ccagtgacca gcagaagaga	480
atgcacagct tctcagaaag aactcaactt ccgttaaggc aacagctgac ttaaa	535

<210> 246

<211> 488

<212> DNA

<213> Homo sapiens

<400> 246

gggatactgg agatgcttga tgtggaagac ttaaaatgcc tttattattt agtggatgatg	60
tgggagattg ggaaggacag gcaccatctt ggcagatggc tcttcttcct cttcatcaaa	120
tgaactgtct atggtttagt caatcacttc tactttcttg tttatggaaa tcctaaagta	180
ctgtacagac tgtgatcaaa tacaatttaa ggaggatggc acttgggcac cgatgagacc	240
aaaaaaggaa gtacatgaag tttctgcctc ttacaatgcg aaccatggat gctttacctc	300
cacattggat cattctgtaa cgtctcacc cagtcacata ttcttctatc agaaagtata	360
ctttgtatga caciaactgt ttctgtacca cacattcttt gactttttgc atacttttct	420
aaaagtcatt tatcaaaactt atgtgaggtt ccaaaatatg taaaaatgat aataataaaa	480
aaagatta	488

<210> 247

<211> 623

<212> DNA

<213> Homo sapiens

<400> 247

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ggggaaaagt ggcaggaaat aaagataaaa aggtagactg ggggacaggc tgtgaaggga      60
tttgaatgcc aggctaaggg atggaattaa tcaaaaaata acatgataac attggagggc     120
tttaaactgg ggggtttcat atgtatgtct tacaaaaact actctggcgg cagaatgaaa     180
aggagttcag agtggttaag atcagagaag gaggaacacg atagtaagtc actacagtag     240
cccaaaggaa aagctaaaac actagcaata ggatgaagag aggagggact acaaagatgt     300
ttaggaggca ggcctacaa aatctgatcc tgagcacaaa accccatttt agtcctgtgg     360
gctaagaagc tacaaagaat gacgggaaac actctaactg cagggtttgc aagtactatc     420
ccccgcctc accccccctt cttttctttg ataggcagaa ygaaataaaa taaatagacc     480
cttgaatctg ttagctccag aaaaatgcat gaatctgaat ttctcttact agctgggagg     540
cttgactgct gagagtgcta tactggtgaa aatgtaggtc agccaagca ggcagcagtt     600
ctgtagtgct ggctctgaac ctg                                             623
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<210> 248

<211> 649

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 248

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gggtcttggt gatcttttta tctaccctgg tgtctggcaa gcaacaaaca aatatcatca      60
gcagaaagcc aggctcagct gagatcatga gagcccagga agcagttata tcaggagtaa     120
caacctgggt cacagcaggc ccaggaccct ggaagctgag ctcccctata tgggaaagga     180
agaactaaag ccaaacttca agtgcccnnn nnnnnnnnnn nnnnnnnnct gagaacctct     240
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gtctgtccct tctcctgcaa agagaaggac acaggtggga gaggagcatg ggggtgggaac 300
aaggtcagac ataggcctgt ggtggtttga tctgttccat acctaggatg gggactggag 360
cctgctcagc tttcaccttc cagcgttacc tggagcaacc ctgtggggag ctgtaggctg 420
tccccataga cttctgagat gtctttcttt ctctccatct gcaggaagat gtcagagccc 480
cagtcttttc cctaggagag gcttccctag atgggtgggag tcctggccca ggccactgtg 540
ggttttacga agttgaaggc cctgggttcgg tgatggcaca ggggcacaca taataacttc 600
ctgcctttca gggagcacag ctgagctcca cagcaggaca cctgagcag 649

<210> 249

<211> 520

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 249

ggtaatcaac tttacaatac aagcattctg agaataacag tgttaaaaca gggtatttcc 60
ctttagtcaa accttcacgc aaatttaagt atccattcta tttgattctc tgtacaaaaa 120
atatgataga taaagggaca gaatatactt accaggagcc aataacccaa cggctacta 180
tcataatccg gcagatctgg agcaatctta caagcttgta tgttcaggta tttaaataatg 240
tggactatgc cttttatata tatctaaata aagtcacaca gatgtagcca aattattact 300
catctgaagt atgctccttt ttatcatatc aacattttat gtaacataca ttgggaaagg 360
gaggcatttc tatcaagtac atacagtgnn nnnnnnnnnn nnnnnnnnnn nnnnnnnngg 420
ttaagtgtta ttttaggtgt ttaactggta aatatgtttt cattttctag tcactaatac 480
atttcagtaa tatataaata aataactttt gattatactg 520

<210> 250

<211> 632

<212> DNA

<213> Homo sapiens

<400> 250

gggagaaaaa gtggcaggag atgagggagg acaggaaagt aggaaccaga ttgagaagga	60
ccatgaatgt gatgccatgg aatttggatg gtaccttgaa aagtggtaag gaagccattt	120
aaaagatttt aagtctgagt atgatgtggt ccaatttaca atttagattg ctggggcagg	180
aaggtggatt tgggtggttgc tggcaatggt tgaggaatga aggaagaggg gaggaatgga	240
agggagggtt actgtaatta ttagataact aaaatggtct agcaggatat gactgaactg	300
gggcagggtt agcggagatt actgagatac tgtagaatg ccttcttggg tttggaagta	360
gagaaaagaa aacatagtga gttatatatg taatcattaa tgtacaataa aggtaacaag	420
ttccttcttc aaagtataaa agagacgagt ttggaaatgc aagttatttc tccctctgtc	480
tttcaagata acataaaaac tgcagcattg aacaatagta tgtattcatc atgaacggct	540
tatgtgcttc aagcatagca cctataggta ctgaataaat gtgggttata tgtgaacatg	600
atatattatt aaacacatga aatggactgg ac	632

<210> 251

<211> 670

<212> DNA

<213> Homo sapiens

<400> 251

gggtatagct ctgagagaca gtcacagccc acacaggggtg gccagggagt cagaccccaa	60
acttacagtc ctgcagacct cactgtgaga ccctcctgct cagggactgg caatgcccag	120
gcagaaatag ctctgctgaa cacatataac actagttgaa aataatttgg aatggttttac	180
gctttgagga cagctataga aaagcacagg gtaaaatata gccttctgct tagatttaga	240
atcttgcaatg ttctaagagc ttctgtctt tttattctaa aaagtcacac ttcacattca	300
aaacattatt tcctaaaatt atcagctggt ggcacttttc cagaaaagag gcctagcttg	360
ccatctttct atagtctttc tacaggcaaa agtcaagcct gcctgacatg caaagcacct	420
tgacctctga cccagagct cccagggcc acatgcctgc ccagagccaa ggaccatctt	480
atgactctgg taaaagactg ggaaaggcag ggaagggtgcc aggggctggg gaagttgggt	540

cccttctctc ctctcccca ggtgactctc agtcccaccc taagtgatac taggggctgg 600
ggaagttggg ccccttctct cctctccccc aggtgactct cagtcccacc ctaagtgata 660
ctatgggctg 670

<210> 252

<211> 684

<212> DNA

<213> Homo sapiens

<400> 252

ggggagtgct ggacagggtg tgaggaccca gagaatttgg gaggagagga agagggcaca 60
gaaggactgc ttgcaggctt attttgcagc tcacaggaaa ggacaagaga aatgcttgga 120
at ttgcaatg gctttaatgg ttgaccttat gttaatttca tcttactcct aacttaagct 180
tgcccatatc caccatggct ctgacctctt tgcaatccct gtcccctctt cagcttgagc 240
tctcacttct cagtgaccaa ttgcctacat aattctcatt tcacttgtct cagagcgaat 300
acctgtat tt cccagtcctt tagctttttt ttccctggaag ccatgtcgca gtcttggttat 360
cctctgggtt agttccactt cagtcaaag aattctcttc aattggctgt ggcctaaaca 420
gatttat ttc agatgacaca aataagtgc cctggggatt ctacttcttt ggggacaatg 480
agaagaacaa ctgcttttag aaggatctga aagtatgctg ttccctatat taaaatgcct 540
tgtgctctaa ttttttaata ttaaatagaa ccaaaaatcc acaatgctgt agtttctaaa 600
tggtgctctc atgagcatca gaataaaaag gtatcctaaa cctcccaccc aactcatggg 660
ttcattat ttc tcaaatatct tttc 684

<210> 253

<211> 677

<212> DNA

<213> Homo sapiens

<400> 253

gggggctcat gtggcggccc actggtgggg catctcgccg tgtgcatgcc ggcaccacag 60
aaacacaagg tgcagtggac agagaaacag gcagcaaggg gaagtggctg atgtttgccca 120
gggcactggg gggggccttg gggccagggt ttgaagtctt ttctatgaat gacaaaacgt 180
ttctggggga tgatgtcgtc acttgctggg agcagagtgg ggctcgtggc tgggttcgggg 240

cctgcctccc aggetccagc catcggctaa caggtcgagg atgcttgtcc cgagcagggt 300
gcctacaggg tgccaatgac atttaciaag aactgttctg caacagtcta ctatgaacat 360
actggaaggc tggacaggca ggggacgatg gacagaccgc agcttttctg caggacgtgg 420
gcagagctgg agaggcccta caacgttctg tgccactgcg gtcacctcca tcgtactccg 480
ccttcccctg ccaccacagg acctggatgc aaagacaccc ccaaagacct aaagtgtggg 540
tgagatggac aagtcatggg gcatctgaac aaatcagccc gcagcgatca gatactatgg 600
gctggctcgg ggctgctgtt agggacaggc atacctgaaa taaaacaaac aaacaaaaaa 660
aaacaaggaa aaacccc 677

<210> 254

<211> 572

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 254

gggagcctta gcctgctcct ccctacccat taccaatgt aagttgtaag gcaactgttg 60
gctagaagaa aggatctcaa cccactgttt ctgccctcac caagccctgt cttgctagcc 120
atctctgccc tcaacccttc ttagtctctg caatgttcag tgaaaactcc ccagacacag 180
cagtttgctg gtgtgagggg agaggaagtc ccaaggctgg ggctgggcca ggtgggacct 240
ggtgctttgc aacagcatcc catttgacca cagttagggt ttgacctga tgggaggagc 300
agatggaggg aggcacagc tttaaagtgg gaagtggat gggnnnnnnn nnnnnnnnnn 360
ctcagaagga ggctttcagc ctttccttgc tagttcctgc taactgtctt cttgctcaga 420
ggagggtagg gaagcatgtg tgcaactggg ttgggaggtg ggggtggatgt caccaggcag 480
gggtgcattg atttgttgaa gaaggcagca tatgaggcct ggcagtggga cagttggagg 540

aaccattttt tttttgtttt ttgtttttta ac

572

<210> 255

<211> 674

<212> DNA

<213> Homo sapiens

<400> 255

gggggtgtgg acgtgctttg ggggaggtct ttaagtctat tgtttaactg taccatccag 60
agcccaccag aagctattga tcattaaaat tatgagaatt tcaactcccg ctgttctctc 120
tttccatgac tgcccgcagc tgctgctgca catctgctct ggggtggcggc ttgcacatgg 180
aaggagcagg tgccatggta gccaccctgc cctgctccta gctgcggccc agtgttacca 240
cttacagcga cgacaagcct agatccaagg tagtcctggg gccaaacccc gccaggagc 300
agtctcctgg ctacacctgg cctcatcatt ccgaaggcca tcaactgccac catgctgttc 360
aggaacatgg taggataagg tgacgaggct tggaggcctt tgggtgtcca cttgagttca 420
cgtggggaac tctgggttcc aggatcgctc ttcagagatc tgaacacctg tgttttcttt 480
gaagcaccaa aactcttcct actgtggacc atgagtttat taaccattg ccctaggctg 540
acagaagagc cctcggagca atcttggaag caccacctgg cctcagtgtc cgctgttcca 600
caggagccaa gccggtgctt ctccctcaca ccagaaggta gactgtgtca cctgccacat 660
ttcctctaag gcag 674

<210> 256

<211> 649

<212> DNA

<213> Homo sapiens

<400> 256

ggggctggtt cttccatact ggaaggcagt tgggttctac cactagggga ccattgtcac 60
tctgcctctc tgaggctcag tctcatcatc tgatgtcatg ggccatgact gccaggctc 120
cttcagcac ttcaatgcca gggaccaata tgtgagtagc agaggacca tcgcctgtcc 180
ccccacataa aagcacatcc caatagaaag acaaaacatt acaggggcca aacactacca 240
gaagcaagtt taacaacttc gtgccccaaa gcccttgctt ctccccagct taactaccta 300
ggtatcaacg gaagagaggc aagagttgtg ttaagacact ctccattcaa agaacaaaat 360

ggtgaaagtc ccaaagagtc ctgttctcta gtgacttgta ggttcgtgca taaaacgaag 420
 actgtgggta catacaaagc cttatgttcc agaaggactg ataatagaagt aaggaaatgg 480
 tgctccagcc atctgtgtta ataagcactt ggttttcaac ttgatcatta tcttatggat 540
 aaatatcttg caggcagttc tgtagttttc attaggggat gcttaaggca aaaggtagct 600
 catgggtctt aactctgtgg tcaactgtgc ttatathtag ccttacaaa 649

<210> 257

<211> 667

<212> DNA

<213> Homo sapiens

<400> 257
 ggggaaaggt gttgaaatct agcaggtctc taaaacagag actccagagt tcttttgaag 60
 agacctgcaa ctgaaccatg agtcagaaga atttaaaatg atttggttaat aagctctgag 120
 aataggtctg gagatttcaa gtgaggcatt tgcaaaacaa gatgggaggg agcagactga 180
 agcagggacc ctgggaaacg tgaggcaccc tgggagaagt gggggaccaa ggaggaaagg 240
 agataggcag gaaactcttg gctcctgtca atcatcaaaa ccatggaaag tcccagaaag 300
 ggtttatcta ctctgttaat tcatgctgct aattaaagat tccagggaca gattgggatg 360
 ggataaacag gggagacggg aggggactga tttttaaatg aatgtgcaga aaacaaaaaa 420
 atcccaaatt tcctctctcc attccacca caaatatgcc tctcttcata gttcagcaaa 480
 ggagggtaac ttctatcagc tcatgaaact catttccac tggactgact gtaaattcaa 540
 aattccaaga gtgcttcaaa tgggtaagtt actggtgata ttttaagtac tttttaaata 600
 aactgctcac aggtggggaa gaaagtttcg gtgcaagatg ctttaatgac ttggaatacc 660
 ccattct 667

<210> 258

<211> 650

<212> DNA

<213> Homo sapiens

<400> 258
 gggagatgct cacactggca cagcagaaca gtggggaaga ctcagggcaa cggcaacggc 60

gggagtgggg cagctgccga gtaaggggtg tgagaggagc gtacagacac gtgtcccgtg 120
ctccagtagc tttagaatgt cgtgaatagt actccattca cgcctccacc tgtttaaagc 180
ctgtgttagt tatatgtgtc ctgtcatgtt gtctgctttg agtcttagga ttcaatgagg 240
aaacctcgat tcaattttct gtaaacttct gtttgggaaa tgctttctga tagtgacggc 300
aatggaaata tcaagcaacc aagggaatc tgaagatccc agagagccca gcaagcagca 360
acatcctcga gttaggcaag caagggcccg gagctggcca gaccatgggc tggaatgcag 420
tgggggcccg tcagaggggc ttcttctggg gtctgactg tggtttctgc cagaggtgga 480
gcaagttgga actggatgtt gagtgaagtt tcaaagaact tagaagtcaa atggggaaca 540
ataatcaaag gcttccattt tgaagctgaa acaactcaa attctgctgt ttcacttagg 600
ggagaacacg agcaccatgt cattatttta gtttatggag ctgctgttcc 650

<210> 259

<211> 630

<212> DNA

<213> Homo sapiens

<400> 259
gggatttcca ggaaattttt cactctgttt taaaaatgca gtatatctgt ccattgcaga 60
ctgcacatct ctacggtaaa ctgttcgaag aatgaccatg acgggggtcaa actcttgatc 120
ccagacttca gctttgggag tatacatgcc ttgttgcata gaacctccag gttcaaaaac 180
aggagcctta aaatcagcta cagctgataa aactgattca aagctgtaac tgcctggaat 240
aatgccactt ttgggattag gattttctgg aatgagggtc agcaatgaac tgtgtgtcct 300
gtcattcata cacagctggg ctaccatctc ggccctgaga atctcatcat cagacattcc 360
taaagttaaa cgaagactca aaagaatcac aagaaatgta agagcgcctt ctaacatcga 420
cctctcatgc tctgcatcaa gtactgtatt ttgatgttgt gatgccattg tcaacaaatc 480
cactacctta aatctttcaa agacggatga aataaaataa tctgggtcaa gtctagaagc 540
acaaaccttt aaaagaaaac aaaatgcttt atttctcaat attcagtttt ccttcttcta 600
ttaatcatgt tttctatac ttttttttgt 630

<210> 260

<211> 705

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 260

gggggttgcc cccgcagcac cactggatca gtgcagcata ctcagagctc agagtgagcc 60
tctttttctca agcagaagat ccagagcaaa tccatatggc cagttctggc caggtgccca 120
gccctgaacc aatcacaggg attctcactg cccagtcctg gctcacatgc cccacccaaa 180
cgacatgaac ggagcagggg aaggatggag aagggaggcg ctgttatgag aacaggagtg 240
gatgctggag agnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 300
nnnnnnnnnn nnnnnnnntc catctcaaaa agaaaaaaaa gagagaaaag aaatctccag 360
gacactcctc aatgccccgg tgccaggaac agaggacatc ctacgggtcca caccagctcc 420
agtgctccct ggcttgcaac gttaggacac taagactcag aggatgccag gagtggccca 480
agattacaca gtcttcagag cccaggggtc ctatgtcccg tgccaccaac tctctggtcc 540
ctcccagcca tcaactggtg ctggtgatac agcttcctgt caccacaaag ctcagacaca 600
tgggctctgt acctcaagag ataaagacca gcccaccta agtggccctg cccaggatca 660
ccagccctga taacaagact agctgggcac ccgggccagc cttca 705

<210> 261

<211> 483

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 261

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gggacaagct ccagtgtaaa gacttcaagt ggttcttgga gactgtgtat ccagaactgc      60
atgtgcctga ggacaggcct ggcttcttcg ggatgtttct ctttgagtgg ctggctaatt    120
cgaattggga tccaaacaag ctccagaaca aaggactaac agactactgc tttgactata    180
accctcccga tgaaaaccag attgtgggac accagggtcat tctgtacctc tgtcatggga    240
tgggccagaa tcagtttttc gagtacacgt ccagaaaga aatacgctat aacacccacc    300
agcctgagnn nnnnnnnnnn nnnnnnnnag gaatggatac ctttatcatg catctctgcg    360
aagaaactgc ccagagaaat cagaagttca tcttgcagga ggatggatct ttatttcacg    420
aacagtccaa gaaatgtgtc caggctgcga ggaaggagtc gagtgcacagt ttcgttccac    480
tct                                                                    483
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<210> 262

<211> 508

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 262

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gggcggggag aggaattgag gcagaaggta aaagctgtta ctaagggaaa gagccaaacg      60
gttcggagca gccaacggct cagacactca aactgggga gagaggaatg gggaccagcc    120
aggcaciaat gagctcgcga ggccnnnnn nnnnnnnnnn nnnnnnnnna ggaggggaat    180
ttccttgtgc ctccattccc gggagggggg agcggcggtg gaggccaccg tttccaggct    240
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tcttcaccag tttggataat aaggccctcg tgggtgtgttc atctacttac ctgaaataac	300
ttggaataaa taatttcgat tacacgttga agatacaatg agtgactgtt tgggttttcc	360
agtgtgattc attttcattt ttgttaaaat aagacccatg ctacattgat gtattttagt	420
aatgccgact tcctgggatt gtatgttctc accattttta tagtttatag tctggggaag	480
tagggcacct ttgtctcccc gaaaacat	508

<210> 263

<211> 464

<212> DNA

<213> Homo sapiens

<400> 263

ggggcttaga taatagattg aagctgccca cagaactgag tgatgatacc acccatgctg	60
cataaagctg cccacaggat taagtcacat tagagataca aagcacttag ctcaagggat	120
ccaggctgca ggcactcaat ctattatcta agccccttgg ctgttctgtt ctaagtctac	180
actgaagact agtttatcca ctgtcctctc tgagtttggg acacttgagt ccttctttga	240
ggcccaggca gtttgagggg ccacccttaa agctgatgtc tgaactctag gccatggcgc	300
ctgcccctag gtatgatgcc ttgtggaact gggaactttc ctctgctact ttcactctca	360
ctttaattgc tagaggggtga taagaatccc aagccctaga gatgttatat ttatagtcag	420
taatgccact ggttccttca aatttttgct ttggcagaga acag	464

<210> 264

<211> 574

<212> DNA

<213> Homo sapiens

<400> 264

ggggtagac aggtaccggt cagattacgg tggcacaggc ggcgtggggg tagacaggta	60
ccggtcagat tacggtggca caggcggcgt ggggtagac aggtaccggt cagattacgg	120
tggcacaggc ggcgtggggg tagacaggta ccggtcagat tacggtggca caggcggcgt	180
ggggtagac aggtaccggt cagactacgg tgacacaggc ggcgtgcggg tagacaggta	240
ccggtcagat tacggtggca caggcggcgt ggggtagac aggtaccggt cagattacgg	300
tggcacaggc ggcgtggggg tagacaggta ccggtcagat tacggtggca caggcggcgt	360

ggggtagac aggtaccggt cagattacgg tggcacaggc ggcgtggggt tagacaggta	420
ccggtcagat tacggtggca caggcggcgt ggggtagac aggtaccggt cagattacga	480
atgcatgttg acgctttcag ttcacccctt tctttgctaa ctttcttctt attttcttct	540
aatgcgagag cttattaatt ccatatttat catt	574

<210> 265

<211> 486

<212> DNA

<213> Homo sapiens

<400> 265

gggatgaaga gtgagacagg tccttactga tgaagcctct tcccctcaat ctaaactaga	60
tgataaaaca ggagcttctg gctgagcgtg tgaggcagta aacacacaaa agcatttggt	120
ttgacacgtc tggcagaggg gctcaactca acacagcaaa cactcctgca gatgtccgga	180
gtcaagccgt tcctccagac taaggccctg cagtggtcag cttggaccct agcagggcag	240
ttgagggctc gggccccagg gccacagaga cttggcttca caccttacac tcgggaacca	300
cacggcgatc ttgggtgagc gacagaacaa gttactctct gaaccccagt taatagaatg	360
ttctttatgg ggaaatgagg tgaaatgaga cgggtgtgaca gagcatttac acacatggaa	420
acacatagga agtacaggct cttgatgctg ccattattat taatcatatt ggttaatttt	480
tttttt	486

<210> 266

<211> 460

<212> DNA

<213> Homo sapiens

<400> 266

gggagagagt atgttagaaa tcaatgggtc atgactgggg ctgagctcga taatcagaaa	60
catttattat gaacttatca tgtgccagca ttaaattgtg caagatccac taaaagccag	120
ccaaataatt aacaaaaagc acatcaacag aagagataaa cagaagagat taaaaacaca	180
aatattctca atgattctca ctcaaaaaga ttctagaaac cataaaatgt ataagccact	240
ataataactc agaaggcagt gtgacaagaa aaaaattagg attaagcatg cagattaatg	300

gacgtatttg aactggaaat aatcattttt agatatacctc attatcaaac tatatgagtt 360
 accattatat caagcagttt gagaaaaaca gatgatgctt actggagcat cactgaggtg 420
 caaagacaga gaataaggct gggaatcaaa aacttcagct 460

<210> 267

<211> 449

<212> DNA

<213> Homo sapiens

<400> 267

gggccgtggg ggagtgagtc ccctgctgtg agaggaccct agcgtcacct ccttagccag 60
 ggcagctccc agggcctggc ttccttgctt tctccttgca ggtccagatg ccatcctgct 120
 tccccctcag ttttagcaggt agacattact gacaccattc cacaccaggt ctgggctgag 180
 ccggcgggga caggggcagg gtgtactcag atgaatgagg cacagtctgt gcctctcaca 240
 gccagatggc agaggcagac acagaaatcc atcatttcaa catgaagtgg cagaggggag 300
 atacggggcc attggggctg caggacccag cctgggtgggc agcggcagct tctaggaggg 360
 atgcatttcc agcaaggcaa ggtgaaaaca gcattgtagg caggacataa aagcatagga 420
 actgtgggaa tcttaagcag ctgagttca 449

<210> 268

<211> 521

<212> DNA

<213> Homo sapiens

<400> 268

ggggagggga agggtgattc aagagaaatg aagcatgaga tggaaaccat tgagagctat 60
 taagaactta gatttgatga agcttgagaa ctcatctggc atctggggtg acagggatat 120
 aggagcgcag tccaggtaaa taatagccat cgactagcag tgaatttagt agaaagagca 180
 agttaatcct gatgtataac cagccctgac tcacttcttg ggccagagaa aaaaatattc 240
 attgataatt taatttctac atttaciaat attacctcat tcatgtcctt gcatttcacc 300
 tctttccctt ataggtgatg tcaaggtaac ctaacacttt ttaaaatctt cttaccaaatt 360
 ttacattaat tcaaataaag acttgaaatt tgtacattat taacgtgatt aattatgaca 420
 tttccaaagc ttgatttttt tcttttaaaga ctactttcta ttagatagct gtatatattc 480

caattacaca ttacttttaa atgtaccatt ttaggagatt t

521

<210> 269

<211> 557

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 269

gggaaatgtc ttaaatgact tccaaaatgt tttgtaagaa atatctttat aaatggataa	60
aaatagacct gcttgctaac aattacttgg taaaacagca ctcatTTgtt tgtacattta	120
gctaaaagat taagcttatt accttataca cacatataca tcaattttgt tgttactttt	180
ataaaattca gaaagaagaa gaaaaggag aagctcctat tatgttttaa attaactagc	240
cttgcatttg taatcgcatg gtcttacctg catatgcata catgtgaaat tctaataaga	300
tagacttggt ttcatTTaca aatatctagc agtacatata accataacnn nnnnnnnnnn	360
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn gtactacaca attagtagaa agcatatttt	420
agagacacgc ctgccgcaaa atactcagtc aagggtttac tgtcctaccc tctctaggct	480
tcagcctcct catttgtaat tcatgttaac aactacagat aaactccaag gattcttcag	540
cttttaggga tgagaga	557

<210> 270

<211> 550

<212> DNA

<213> Homo sapiens

<400> 270

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ggggtgggtg gccagaatgt cttccccttg accaaggacc taacacctaa gactgggtggc      60
acaaacacaa catccttgtg caggaagccc aaaccctgcc ggctccatgg gtgaagccat      120
gctttgaaag gaacagggtc acccttgctg taatgtgctc ttgggaagtc atctgcccac      180
tctgctctga gcaggcactc gcttacctgg ggcaattctc tctgggggag gtggcgggag      240
ggaacaaaag ctctggctga ctgagcacct gctacacacc tggcccaggg ccatcacagg      300
ggtactgggt caccgtccca ccttcacagc actaacgtcc caccttcaca gcactaacga      360
ctagagaagg agggaggggc tcgttttggt aaagaaacaa aaattattct acaagttcag      420
aggaaggaca aggttccgtg tctgggtcaag ggtaggcttc aaagacgtct ctgggtcaaag      480
agtccctgag agctgggcct gacagcctgg acacacagag gaagggtcaag tctctgggat      540
gctgtctgag                                     550

```

<210> 271

<211> 665

<212> DNA

<213> Homo sapiens

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<400> 271
tctggagctc caccgtgggtg gcggccgccg gaggagtcca ttccagatgt gcttaccttc      60
agctcattct ccagcgccat ctgctgatt ttctgatcca gcacgcggat ggggaaggtc      120
acctggctct ccagggagtg gcagaggggtg aagaacttct ccagggtggtt gtcctgggtg      180
tgtacagaag aaacagcttg cacttcaata ttaaatactc ccttatgtcc ttcagcccac      240
ttaatgggag gattctgtaa tgggactttc tcagcagaat gcatggagta gttgggtggc      300
aatttttcca aggcaactgg gagacagtag gatccagttt gaagacgttc atttaagaga      360
attggcagcc atgaatatcc caggagagtt tccacggagg ctccctgctt ctgctgacag      420
ctgatatggt agaagggtgaa caggaggtgg tgatttactg tgagcttagc ggggagctta      480
attttcactt cttcataaaa gtcacgagac ttattatggt atgtaacagc tgtgtacact      540
tcctgcagaa attcaggccc gctggatttt ccaaagatga ccggcatcgc attgctagca      600
tcttctccac acataaactg gatctttatt ggaatgttcc gggctgatgc tagtttgttt      660
acaaa                                           665

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<210> 272

<211> 596

<212> DNA

<213> Homo sapiens

<400> 272

gggacagcag aaaataagga tgagttcagc taaaagtaat agaatgccta atttatagtg	60
gcttgtatcg tcatttctca ttctgacatc cttaacaaca ttgccaggga gcccgttatt	120
aatgtagatt atcaggctcc acttcagccc tgcaaaatca acattcccat tgtaaggaga	180
ttccaagcg attcataggc ccattaaact ctgggtctaga aaacagagat acttagatat	240
ctcacagaat aaggatagga atgcaagcag ttccagagtg gctggatcta aatcaccaat	300
aacaggcttt tgtctcattc cactttgcaa tccctagcat gttgactttg gccttttggt	360
gtgtggcctc aggattccaa gatggctgct gtggctcctc gcaccagtgc attctaggta	420
ggagaggagg ggcagacgtc ttctaataatc tcattggcca gacgtgggtc acatgttgac	480
tttttttttc tcttttaacc tticctatgg tactgaacat gttgactttt agatgactca	540
cttggaaga taaaaggatt aacattacta atttatacat tcattcattc agtaaa	596

<210> 273

<211> 681

<212> DNA

<213> Homo sapiens

<400> 273

gggtctggga tggaactgca caaatagtga acactgagtc agaggaatca aaggcatcct	60
ccatcaagat tctccaagg agaaggaaaa ggtgggcaga aagaggagtt tcctaggaga	120
gccaccaggt ggagccacca ccacaaacct acttcatggc ttgtcctctg ggtggatttg	180
ggcggacacc agcaggagta tggcgggagt cttaaaccba tgactaacct atgggagact	240
cattagtgtt aatgccttga aatcagaaga cacagagata gaaaggagat taaacataac	300
agaaaaaaaa atctaaaaac cgattttatc aatgaccac acataatcg aacatgatgg	360
ctataccctc ctatgtagtt cttaccatgc atttcaccac cctcactct aggctcaata	420
ggttcagaaa ataacatgaa aaagggtaac acacactcca acatcaattg ctggtgctaa	480
caacgcagtg tccaataaaa acttgccaga aatgcagtca gggatcagtt agtttaaaag	540
acttctttaa aggctcttga ctccagagct ttgagaatg aaggccact ggaaaataag	600
actatagatg cgtatacaga tacattcaca cagacgtata tattactgaa tgactatgta	660

tcatatctat ccccatcac t

681

<210> . 274

<211> 646

<212> DNA

<213> Homo sapiens

<400> 274

ggggttagac aagcttgctg tataccttaa ggcaaattta atgaaagcac cactgaacga 60
tgaattagtt cactgagttg attgagaatt taatcactca aaagcaaagc ccagagaaat 120
tcaagtcagt aagatacaag gcaatTTTTc ggtcttaaatt aactaacagg tagcagaata 180
ttgagcattt gatattttgt cctggataca ttttttatat ttttaattca ggaaaacata 240
cctaattggt gacaaaatat ataattctca tacacataaa aatatttata aaagaaaaaa 300
tccacttgga catcctttga ttttctatcc taaaaatggt tcaagttttg gaatcattta 360
tctactattt aactgtagca ttttacatac agaatattct ggtatctcaa aaatgttaat 420
attttaaaag ccacaaacc aaagtacatt tcaaaccat aaaactttcc tgatgaaata 480
cttttaaaat gtcattttta cctttatagc attaggcaag cctctaaaat aaatttcagt 540
gtaataaatg accttcttg taccactttt tgcttctttt acttaacata gctaatttaa 600
acttggcact ggtgcaatat aattcaagct aactaccatc aaaagg 646

<210> 275

<211> 631

<212> DNA

<213> Homo sapiens

<400> 275

gggtctggag tccctagtct ttgttgatat cttagctgtg aagggtgaaa aatagaatta 60
aagatatttt ggcagattat aagcttcgga aaaatgaacc actaaacaag ttattttttt 120
gaactctaaa agaggaaatg taaatgtttg atactattat cagcctcaca gtactttcca 180
cttactgggt atttgacata tagataagca cgtgtatgag tatgcacacc cacttaaatt 240
acgatgggtat ttaaggtagc ctcttcatct acttactgtt ctcttgcccc ctaaacttag 300
agaagactaa gagtgaccaa ctgtggaatg aggatatttc aaagaccct gtatctagcc 360
ttcttttcta ccccagacc ctggtagggt ttgctaacac caactccagg gacatatacc 420

agaaaaccag tgtttctttt tagatattgc cagcttccat tcagccctcc cctttgtata 480
 aacaagggta aggaccatct tgtattcatc tctgactcca atagtgtctg gcatagtgtc 540
 ggtacttatt caatgcttat taaacaaata cattgcaact cacttttgac agaggctgtg 600
 ctctgtatct ctcttgagtc tctaacgttc c 631

<210> 276

<211> 659

<212> DNA

<213> Homo sapiens

<400> 276

ttacagcaat cttgttacat tggcaacaag aaagccatcc aatgagccac ccagtagtta 60
 gtcaaagtgt agtaattaat tcacgctttt cttgaagaaa ctcaaagcaa ctactactc 120
 cagtttttta ccaaattccat ggaagaagag gatcatcaag aagccttaat ccttttgggt 180
 aaatggaccc actgagaagg ggagagtaac ttgtccaatg tcacgaagcc agcctaaggc 240
 aaaaccaggt acagaactca gactacccaa gccgggtgcc acattagcac tttagaggga 300
 ccgatataata aaactctctc aggggagcta ggcacagggt cacctagaca gcttcaccag 360
 caaagttttt aaaggagggt gagaacgagg cttgctctaa tagcagacaa ccaactcctt 420
 ccaatcagaa gggagttaaa agtagtgta gcatatggaa aatgccaatc cacctgttcc 480
 atcttgatg agactgacca ctcaactgac tgcttgctga tggtaactga ccacagtaag 540
 aaggattctt gtgtctcatg taacgctcct ctcccttttt ggtagctctg agctgaaagc 600
 ttctctcccc atgcacggca atgggggaaac caaggcacc accttcaggg ataccctg 659

<210> 277

<211> 457

<212> DNA

<213> Homo sapiens

<400> 277

gggtggcggg accggccccc cgacagtcca gctcctttcg gctcttgac gaagccctga 60
 acgctgagga gagagggtgg actcctgtct tcttgcccat ctaactgat cccagtcct 120
 ccctgcccgc ctccagggcc ctggccaccc ctcccaagct ccacacttgt gagaagtga 180

gtaccagcat cgccaaccag gctgtgcgca tccaggaggg ccggtaccgc caccggggtt 240
 ggtacacctg tgcccactgt gggctgaacc tgaagatgca ccggcgcttc tggcagggtg 300
 acgagctcaa ctgtgagaag aatgcccttc aggaatacta ggttcctgca accctcacct 360
 ctggggacga agaccctcat gccctcagcc tgcctcactg ctggggccagg gtcatgccta 420
 tataagttgg catggcaggg acaatgggtg gcagttg 457

<210> 278

<211> 720

<212> DNA

<213> Homo sapiens

<400> 278
 ggggatttta gataatcatg gctcccacgg tagttttaga aaatgtggat actgccgcct 60
 ggtcttcttc ctagccattt tgagtttgct ttccagcttt tcgctgggtgc ttcatactca 120
 ctttttgac tgccatagcc ttttgtcaac cgtatttcca ttacttctc ctagtccgtc 180
 tttctctttc acttgtggtt ttcttcctt gtcatttaag cattctcaac tgcacataga 240
 aatccaacag aagccttttg tgtgggggat tccctcagtc ccaggcagtc ctgaaagcag 300
 caggtgtctc tgcaaaggct tctgtcagac cttagactta taccagcag ctgctaattc 360
 tgagctctca ctcttaaaaa gcagtaaaat agacttcagt caaaaacaag tatggtggga 420
 gttaactccc tcattctgag ctcaagccac acttgccttg aaattttcca aaaattcact 480
 aagctaattt ctctcactat ggaaagagag aaaggctatg ttgctggtat acaatgctgc 540
 ctgtgatgga ggtggtgagg cataaatttc cctaactgga agataaaggc taaccacgta 600
 tgtgggtgat ggggggttga ggtagcttcc agggcactgg agctacaagt agaagcacia 660
 attttcttgg ctggaaacag gcccttagag ggaaacatca caccagataa ggaaataatc 720

<210> 279

<211> 708

<212> DNA

<213> Homo sapiens

<400> 279
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 ccctgggtccc ctggatgtag gctggcaaat ctaggcctg tcattctccg cttcggttta 120

cctttccgaa ttcgccctgg ggaatcacca ggtcggggca gcctgtagac gcgaggacag 180
 gctgttggga gggaagtgga agggccctga aaagtcccca gtgttccccg tgggtggctgc 240
 gcacgttgtg gtctccgtcc gtgggctgtt ttttccatt tactgcagtt cctgggtccc 300
 aggtgtcagt gttgcagtct ccaaagtta gtccttttc tttctttcag aattaggaac 360
 ttagctgcgt atttgatttt gcgaattagg tgatttgtaa cttcagcgt tactgatgac 420
 taagtgttta tgcaagttcc atttgtcct gagtaacagg aatggcaaaa gagccatctc 480
 tggaggtttt ttgaaatgac cgcttgcta ggcgtgttac gcagtttcat tgcagcctgc 540
 gtgggtctga cttgcgggtc actcatatc tgcgaggteg attgaccac gctgaaacat 600
 caagtgaata ctggccaaca attgggtccc agactaaaag ccgctgctgt tactcagttt 660
 ctttacctgt aaaataaaaag gtcggcttc ttccacaggt acattgga 708

<210> 280

<211> 753

<212> DNA

<213> Homo sapiens

<400> 280

gggggttgag acagtggata cctcggggag aaggggtctg actgctacgg agtcctggcc 60
 tgaccggaca cactgaggat ttttaagcag ggagagaata gaattggaac tggtttcatc 120
 tgcagggggc ctggctggtg ttgaactagg agtcaggagc gggactttcc ctcggtctc 180
 cctggcgtcc ctctctgag ctggcttcgg ggaccacccc agatcccgtg ctactacccc 240
 atgggtcaga attgcccctg agggcttctt cctcggccat cgcgaggctg gggggagcta 300
 tgtgggcctc tcctgacaca ggccaacctc atcatctcag cctataaata ggactcagga 360
 ttagtctgga aatagctgtg ccaagccaac tccgcaggca tcataggcac acacagttcc 420
 ggaaatggtt cttctcctca acacaattaa aaccaaacac ttctcagga aactattgtt 480
 cacactccac tttgcttcct taagcacaag gccgtcaatt ttggggggaa gaacctgcct 540
 gcctactgct gattagtggg ggtatgcttt gtggagagga ggcccttttc ctgcttctcc 600
 ctctctgagg acctgaagga gtcactacca ttctctgggc ccagtttcc ccaaaggtaa 660
 attagggagg tgggacatga tgccattttt aacttaccag gatttcaaaa attagaattg 720
 taataaacat gtgagcaggg agaaatgaac agg 753

<210> 281

<211> 519

<212> DNA

<213> Homo sapiens

<400> 281

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ggggagacta ggagtttaat tctggacatg ttagcttcgg gatctaagtg aatccatcaa      60
agtagaagtg tcaagaagtt ggccttaagg gagagacatc tgggcagagg atatacattt      120
aggagtaatt agcatttgga tggaatttaa atgatgagac ctccatggtc atgagactag      180
ctagagatga gaataagaca taggactgct caagggcact aatattatga gactgtgggg      240
aaaaaataaa gaaacagcaa aggagactga aaaggaataa agagtaatat agaaggtgaa      300
ctaagagagt aaggacacca attgaagaaa gtatatcaag gaggaagaa tgatcaatcc      360
tgtcaagtga tgctagaaga tcaaataatt tacctgtgag tttagcagcc tagatatcac      420
tggtaacatt aataataata ttggacccaa tggatcattc cataagaaaa gaaattttac      480
tacttaaatt cttctaaaac aaatagtttt tgttaagca                               519

```

<210> 282

<211> 666

<212> DNA

<213> Homo sapiens

<400> 282

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gggggtgctcc ttgggttttt gtcctctctc ctcttcccga gccttctctc gcccctcggt      60
atgcctctgt cctccccaac cagcaccctc cccggccccc aacaaacctc cctgtcctgg      120
gccttatttc cttcttccag aacagttgga gatctgcacg gataagctgc tgaactcatt      180
atatgtagag tacatgcaag gatatttggt cggcgctctt ccaaaacagt aaaacatagg      240
agggggaaat gatttggaat ctagctatcc aacaaatggg attgattaat tgcagtgcaa      300
caacaattaa aatatttaca aagaattggt agagacatgg catatccggt taagggaat      360
aagcagaatg cagtattaca tatagtatga gctatactat ctacaggaaa agaagcctgg      420
aggagaatgt accaaaatac taacagtgtc tgtcttgatg tggttaagatt atagctgact      480
ttcttttcgt tgttacaatt tcgtgttttg ttttttaaaa attatacgct gatcatgtat      540
tacatttatc atcaggggaa agtgatttaa aaagatgaat tgggggggtg ttcatgtcag      600

```

atggtggcctt tttgcatcca tccaagtgtg taatggttga attttcattt tagacaacat 660
 ggactc 666

<210> 283

<211> 659

<212> DNA

<213> Homo sapiens

<400> 283

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 aaccccagcc catctcttat ccataaaggc atcaaaatat tttgcaacct aaggaattct 120
 tgagaaaata attggaaact gttaagaacc tagagtttcc ctgtatcact gaccacagga 180
 atccaaagaa ctttcaaata aagacatggg tctagaaaga acgaaaacta acctaattat 240
 aatcccatct toccattagt atagccactg cccaaatagt cctgtgata gctaaagaag 300
 accaataaaa agaaaggggtt tttcctttgc tccagggtgca tgggtaaggg tacttttgag 360
 gaagggtgaga taaaaagtaa cttcaagttt tactcgctat agagatctta gaatttaaata 420
 gtgtgccaat tgtttcaaata tcaatacttt gaggaatcta ttcagtgttg actagacaaa 480
 tctgatttgt ccatttccca tttcctttta ttaactctta gagcaaatta atactctaaa 540
 ccacaaaatt aatttttcac tttctactcc aagtcctgta attattttgt aaaaaattcc 600
 atttatttcc caagcataag gaaagggtatt ttctacttct aaaaattaat gcctactac 659

<210> 284

<211> 451

<212> DNA

<213> Homo sapiens

<400> 284

ggggcgtgaa ccatggtgga gcagggtgat gggttaacagt taagcttata taacgtaagc 60
 ttaaattgac tttcttgtgg ccagacacaa aaccttagct atctaaacct ctgttcctgg 120
 taaataaatg ccttgagtat tataacaggg caaagttcct tctaataatg taggtgctat 180
 cagactcaga ctaaacaatgt aactgcttg gaaaatatga accaaagaaa ctgtgggagg 240
 ccgaggacgc gctccttgtc aggctgatgg gagggagtg gggccctggg tggagcaggg 300
 ggcaactgocg tgagtcttag gggactctgt ttcttccctg cagctttggg caagacacca 360

ggcccttagg aggcctcggg gtcctcatct gtcagactag gggctggccc agcagattec 420
taagaaggct gtcggctctg atgtgtcata g 451

<210> 285

<211> 576

<212> DNA

<213> Homo sapiens

<400> 285

ggaaggctgg ggtcgggtgac cggccgggta tctctggctc ggtgggtgact tagggctctgg 60
gtctccgcag acgatttgtg ttggggcaag gcattcgtct accgacacac ccacagccta 120
cagtgagggga gtgtgggtga ggggatttct ctcccacttc cgactctccc tagagtctca 180
ggatgggggc tgaggaccga ggcgtgggag tgcgatttga caatggagtg atgaaggtaa 240
cccggacccg gggagttgga gggcgctaag tcagccctga cggctaggga gtcgcctgct 300
gctgctgtga tcaaggaaat gtagtccgcg gaacagctga aatacagacg cgtcagattt 360
tgtatggagt tggcttggtg gtcattttaa aagaaactga tgtttttact attgtccttc 420
gataatttat cagagtcagt gtcagtgcta tagtgggaat atctgttcag tgcagcagaa 480
atagatttgt tacaacagtt cttaaatagg ttatagtaga tagatcttta cagatgggta 540
tttctcaacc taagttttga ttattcaaaa aatacc 576

<210> 286

<211> 542

<212> DNA

<213> Homo sapiens

<400> 286

gggtaccttc cataagctag ttgaagccag aggaaatgag aaagatagga gctagtataa 60
aaggcactta agaattctgt cccccttgga agtcctgtgt gtgagaaatc aagcaaggat 120
aacttgtcct gtctgtcttt ttgtaaatca catagtctac ctgtaggcca ccagtgctg 180
tccattttgc atgtaatgcc agcagctggg ctctaactcc tcagcacagt ggttaaaata 240
tcttagacac actaagagtt tcaagttgac actcaaaatt ttaactgcaa atgctgaaga 300
gttagggact acacatgtca ttaatgcatg ctcaagggct caaataaaaa cctggatctt 360

tgattgtatt taagttcatt ctgagatcaa actttttttt ttctttaagt acagatcaga	420
actcatattc ccagtatgga aatgtgagga acaagagtaa aatttcttaa ttaacgtcta	480
ggcttgaagc ttcccctgat ctgtattaat gttcctttcc taatgaacta attcttaaca	540
ga	542

<210> 287

<211> 544

<212> DNA

<213> Homo sapiens

<400> 287

ggcacttttt tgattgtac atttgctaata tatatgaatc aatctagaac tttcttctgg	60
aacaactata gcctcttttt gcttttgtgt tttgttttgc ctctacctaa cctatttttt	120
gaatcagttt acttttgtga attaattctca aattcttgca acctacttgt cacttttaac	180
aattattaaa atctttccct tcttatttta atacatagtt cataggaaag tatttcattg	240
ccagttatga agtctacatg attgttttag ccttttattt cttcagaaag taatataaat	300
cttacttttc tggaaggtag tattagatct atttatacat atggaggaaa atttgaggat	360
aattgagtca ttccatcacc actatccatg agacaaagac ttttccatac caagtgtctt	420
taaagcatat ttgtagaatt aaataaaata tagctataca tattaataat ctttttaaaa	480
aaacttctgg aaggaaggta ttatctaatt ggacatacta agttttcagt gctgcatttt	540
gagc	544

<210> 288

<211> 539

<212> DNA

<213> Homo sapiens

<400> 288

gggaagctgt ggtaggaga atgtaatagt aatccagggtg agagatgcta gtgacttgaa	60
ttagggaagt gagagagggg atgaggaggg agaaatgata ggacttggtg atttattgga	120
tatgatagat gaacaagtga gaaccaagga tgatgccag gtttctggct tgggcagctg	180
gatattgcca ttcacatagc caaacagaa agaggagcaa gcttgagggtg gaagatgatg	240
attgagcttt gatatgttga ctttcaggta cctgttaaac atctgagaag aatgtgcat	300

taggcagata tgtaaattta atgctcaaga gaggagtctg gctagagtta gactatgtac 360
ttaaagtact taaagtggta gctttcagtg gtgatgaaat tgcctaggga gagtgtatag 420
agcaagacaa gggccttgta taaagtgcga agaaagagat gtctacctag gaggccaaaa 480
attgagtcta gaaaggagaa aacccaaggt tgccatattg tataacagga accgtggag 539

<210> 289

<211> 421

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 289

ggggaagaaa acaaaaaaga gcagaactga gtcattgtga tgagactcta tgaccctag 60
aggctaaagt gtttactatc tggcccttta cgaaaaagtg ttctgccttc tgagttaggc 120
cagtgttcta tcattgtttt ccacgtctct aaccatcctt aaatgttcag ttccataaag 180
cagcctcttt aacaaatgca gcctaaatca gtaccactgc ctggatcttg tttcctagtg 240
taaaagaatc aaatnnnnnn nnnnnnnnnn nnnnacctca ggtcccttcc cctcgtcctt 300
taactttcct tctgggggaa atctgtaggt acacaaaaga ggggtggttca ctctttttct 360
agcaaagcag tgctattttag aaacatgaag atggagggct aggaaaaggt tacattacaa 420
a 421

<210> 290

<211> 498

<212> DNA

<213> Homo sapiens

<400> 290
 ggggctcaga ttcacacagt gctgggcata gtgccatggc acctcagtcc tgccaggacg 60
 gcacactttc caccaacagc tgccctcaga gattcatgca gagataaagg gagtttgagg 120
 caaggcctct aatctcctaa tgcttggtgc ctgcctgctg acagtggccc tcgcttctcc 180
 tggaggccag ggtatcaaga aggccttggt cctagtctaa ccagaagcca aatggatatg 240
 taccttgaag ctataacctt gatctaccaa gaatctctgc cgcttggttg agtaagccat 300
 ttctgtgtg tcctgggata ccagtgaagta gaaaaggca ttgtactctt ctgcaaccat 360
 ccctgcagga aaaaatgaga aacggcaata aagaagacaa cattagccat tagaatgcca 420
 agagctaagg gtcccaggct caaaagcaag cactggagtg gaaaagccct gcactcgggg 480
 ttaacacctg aacttggc 498

<210> 291

<211> 481

<212> DNA

<213> Homo sapiens

<400> 291
 ggggaatgaaa ttgtccaaga gtatgtcagt aaacatgtaa gaaaatctaa aactaaacca 60
 gtaacactca gggacaggca aatacactaa ggtcaaggat ggaaattaaa acaaaacaaa 120
 aagccaaagc agagccagga aagtgtaaac acagaagtca agagaagctt taaaaaacag 180
 tgttcaatag tgctggcaaa acatcatgaa agaaaaacta aaaagcaaatt ttggatttgg 240
 aagataagga cattattagt gatcttatta acaaaggtag aatcaaaagt cagactgtaa 300
 tagattttaa aggaggtaga gaagtcaagg agataacaga aatgatctct aaatttggtg 360
 caaaaggaaa tagagaagat aggcaccaga gaggaaaata gtgtgggtgt atgagagtaa 420
 agatacaagt tcttctatct gtttcattca tctattttaa gtggctgaac caggaagtca 480
 g 481

<210> 292

<211> 612

<212> DNA

<213> Homo sapiens

<400> 292

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gggggctgaa acaggcaggg agaggggaaa ggatcaagtt ctccaaacaa gccttagagc      60
aaactgtttg tcagaaaggg gtcaggacaa gaaatatgct gtagagacag ggtgggtgtta    120
aaagggagag aatcatacac caggacatag gtccttgaag atcaggtcaa ctccagagta    180
gagatggggg tcccagaaag ctcaacaagg cactatcaga tacagagatc ttctcacagc    240
tgctctttct ttccactttt tccatctttc ctactgctg ctgaagggaa atacaccaga    300
atcttatggg ctttattaat gagtgggtctg gattacctca gcatttgatt tccaccaaatt    360
cctcatggta ttgcagtagg agcactgaag ggagaattga caatacccaa gtgctgtagc    420
tagctgtcaa agaaagggga cagtgccttg gttccaggag cagtggccg ggaagctctt    480
ccctatggat ggcagagaca ttctcatct cagagggttg aacgttacag agttcgaggg    540
ctctgcaatg agttgcacat ttgcgttcag tgcacattgt accatcttta gttatcttta    600
attcagacaa ag                                     612

```

<210> 293

<211> 510

<212> DNA

<213> Homo sapiens

<400> 293

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gggacgcgtg attccgtgga agaaggcaca tccatccgct ggactagggg aagagacgca      60
actcctccta cagaagcccc cagctctgcc tactttctgc ctctctttc tctatccatc    120
ccttacatgc tggaatgggc tgaaggtctg tcctcagctt ccaactgtcc cccacctct    180
ggagtcctca ctcacacca caacctaact ctcacctact catgtccaat ccagtccagc    240
tctggatttc tttccccaag tgtcccgagt acctctgacc ggactctgca aaccctcaa    300
cactgcacag gtccaaagct gaactcatct tctcctgaaa tgagctcctg cttctctgca    360
ttcctctct agtgactggg aacgttacct atccaccag ctgccaggc agtaaagcag    420
agtcagcttc aactcctccc tcgccgcaga tccaatcagc tttattgaca caacctacca    480
gaatacacat ctttagaatc cttctatctt                                     510

```

<210> 294

<211> 422

<212> DNA

<213> Homo sapiens

<400> 294

```

gggagagagt ctggtgctat ttgggggaaa gaattccagg caccaggaac agggaggagc      60
agggtgggca gagctgtaag gtggagagga gggttggggt tgcaggctgc ctggggcctg      120
agcccagagt aaacagatgc tgaagaagag cctctgcaat ggctgtgcat gaggttgatt      180
cccaaagaac cccacctgca gggatccctt tcacggggag ctctcaagcc ttctgagctg      240
cgcccttgaa ggtggggcct ctcccgctt cctgccgagc ttctcacagc ctggaaaggg      300
caggagggga ggctgtgact aagccccttc caaaggattt gctccccata gatgctccat      360
acaatacagg ttgtggaacc gaagttacta gagcaatgac tttttttttt ttttttgaga      420
ca                                                                    422

```

<210> 295

<211> 703

<212> DNA

<213> Homo sapiens

<400> 295

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gggagggttt ttaagcactg gggtagactg gtgggagagt cctggaggac atcggatgga      60
ggccggttgg tgcagtcagg ccagcaatgt ttgcagatta gcgcttacca cagttaggcc      120
cctgcctccc gcagggactg ggagctgagg gtgttatctt ccttgttggt tacatttcaa      180
aggctcctgg gtccttcgag aagacaaagc tgggcagtga actgagcaag aggccaggaa      240
agggccgatg tcttaaaggg acggagaaat aattcatagt ggcaagtttt ctagagacaa      300
ggaagttggg gctgagagtc ctacaaaacc tggtcaaggt ttaatccccc ggacggggaat      360
ggtaaggctg tctgggccaa tggtcagttc atgcctccag tttagagcag cacctgggtcc      420
ctatgggtcc tgtgagccac atggacaccg ggccaggcac aggagacagc aacagtgtgt      480
tccccaaagc ctctgcagac ccagccccgg gcgcacgggg tcacggataa caggaaatgc      540
actgccagcg gcctcactgc catgcgctgg cacaaatgca cccaggtgct gcctgcctt      600
catccacacg gtcagtggag cgcagcacgc tcagccgtga caccacagag ccacagggat      660
gtgtaagagg agtcggggag ggggagcctc acttcgtttt ttc                                                                    703

```

<210> 296

<211> 494

<212> DNA

<213> Homo sapiens

<400> 296

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gtatttgctt ttcttttaaa ctccataaag gagtattoga tgttaacaga cgtaactctt    60
taatgctcct ctgttcatga ttaagtatgc taagttttta gtaatttaga ctaatgtatt    120
aaagtgttca cttatgtcta gtcatatgca tacctactct cttctaacct tgagtcattt    180
ctattaaata cagcatttaa tcttctttca agtgagaacc atctttccat tatatcaagt    240
gggcaatatt taaattgtct gataagttca tccaaattaa tcccatcatg cctgtttaac    300
tcatttcccc aaaaagaccg cgacctccag ccagtcattc agttcttgaa ctccctaata    360
gaagcaccaa ggattatcta ttgtaatca cattgtggtg aattatcagt ctccaagaa    420
ttatgtaaag caaataggaa ttatttttaga gttgccctta ttttaaaaaa caaaaaaaaa    480
gtaaagatgg gaaa                                         494
```

<210> 297

<211> 416

<212> DNA

<213> Homo sapiens

<400> 297

```
aaaaaaaaaa ctttaaggga tttcgaattg ccagtttaat aggttaactt gaaatagctg    60
gagcgttatt attatacctt aatgaattgg tttttattat tatagtgtaa tgtccattaa    120
tagattaaca tcttgtagat tacctgtagt gttttgtcaa gtagattagg aactggtttt    180
ccttatctga ttgatctaata tatgaatgca ttgcaaata tttctgaata ttcttctcta    240
aggtgtttca cgtaataggga agtgattgaa attaggtgct agataaaacc tatctgtcag    300
tagaacagcg gatgactggg aacctttcct gaacatgtgt tttctcataa accaatggat    360
ctgttacaga aataatgtgt ctttaaaaaa ttacgtatct catggctttt ttgctg    416
```

<210> 298

<211> 476

<212> DNA

<213> Homo sapiens

<400> 298

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gggagaagac cagggtagac catcttcac accagcttcc tgggtgtcct ggtcttctcc    60
cgctgctttc gggacaccac catgatcatg attgggatgg tctcctttgg gtcaggagcc    120
ctcctcttgg cttttgtgaa agagacatac atgttctata ttgctcgagc cgtcatgctg    180
tttgctctca tccccgtcac aaccatccga tcagctatgt ccaaactcat aaagggctcc    240
tcttatggaa aggtgttcgt catactgcag ctgtccttgg ctctgaccgg cgtggtgaca    300
tccaccttgt acaacaagat ctaccagctc accatggaca tgtttgtggg ctctgcttt    360
gctctctcct cctttctctc ctctctggcc atcattccaa ttagcatcgt ggcctat    420
caagtcccat tgtcaccata tggagacatc atagagaaat gaagatgctt acctgc    476
```

<210> 299

<211> 580

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 299

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gggtctatct tctattatca gaatgattct ctgagagggt caaaaaaaaa gcaggggagt    60
ggggaggggca agaaaaaaaa gcttttttagc acagctgcaa tgaaacttag taagaaaagc    120
aacagctctc ccttctctgt gttcagttta aaaatgaaat taaaaaaaaa ttgaggtcag    180
gtctacttca cagtgcctat aaatcccttt ggtagctttt ataaaaggct ctcttaggt    240
atttcttgcc aaaactccct tttctttccc aactggaag gaaacnnnnn nnnnnnnnnn    300
nnnnnnntat gctccacca agagcacgtc aatagtgaag ctaactctgc caaggaagct    360
```

aagtgttttg catttttaaaa agtaacacat ttggtaagtg tggatttttt tcagctaaca 420
 gaaataacca caacaaatga gaacggtaat aaaattgtca aaaataacgt gcatgtaata 480
 accttcctag ggtacttacc caagataata tattgtttcc ttttaaattgg aaagccaaac 540
 aaaacactta actggctgat gcatttctga gtcttctgct 580

<210> 300

<211> 493

<212> DNA

<213> Homo sapiens

<400> 300

gggttgtaac cataatgtcc atattgctgg ggatagtaag gttcttgtct gtgttgcggg 60
 tagttgttac cccaggatcg tccatgccac tgattggatc gattgtcact tggccacccc 120
 catctgttgt ccctgcctct gaactgtctg ttgtcttgca acctacaaca ataaaacaaa 180
 aaagatcttt aaacttccct tgttaaaaaa aacatatgac aaacccatag cagtgettct 240
 ggtttctcat tctaatacac aataaataag actaaaaaac atttttcaca atagaatgtt 300
 atagtgccag ttattcaaaa ctttcctaag attgaaatca ttcttccagt attatactag 360
 gtacacttta cagagacata ggcagactat ataaccaata gaatagttcc aaattaaagt 420
 gaaatctatt caattgtaca aaaatggat ggtaatttat tcctttgact attttgaatt 480
 attaagtaaa agt 493

<210> 301

<211> 566

<212> DNA

<213> Homo sapiens

<400> 301

ggttcatagg tgaagcccac caatcttaca atattcaggt aacttcattg ctatctaaac 60
 tgcttgaaag tgcaaaaaaa gaattgcaaa ttctgttttt aattcttgca tagacagtta 120
 aaaggaaaag aaatcaaagc tacagatcaa tcttatttat gaataatggg gcaaaaacgc 180
 taaataaaat attattttat gaaatccaaa cttatattat aataaacacc ctatgaagaa 240
 gtaggggtgg ctacttttag aatacaaaga tgactcaata ttagaaaatt ctttaatttt 300
 tatatgaaaa tagtaaaaga aatcacaagc ttgtctctat tgaagctgaa aacttaacat 360

ctgtttat	aaattaagca	tctatttcca	atttaacaaa	ataattacca	aataggaat	420
tagtagatag	tagcaaaata	caaatat	tatgtatcaa	ctcaaatcc	aatattatat	480
catgcttaaa	aggcaa	gaggaagttt	tcctggtaag	atcagccaca	ggcaatggtg	540
tttactatca	tcaccatatg	tgatgt				566

<210> 302

<211> 501

<212> DNA

<213> Homo sapiens

<400> 302

gggggaagga	aaactgacaa	taaagctata	ctcactcatt	ttttaaaaaa	ggatatattc	60
aaattactct	aagcttcttc	ccacttaaga	gttttgggtc	ataaaatgtc	ctatctgtat	120
aaataaatgt	ataaataaat	tctttcataa	aagtaa	cactttta	acccttacct	180
gaaaaatttg	ggcacacctt	aaggcctcca	ccacttgagt	ttttaataac	tgggttatat	240
ataagcctgg	gaatctctga	actaaccaca	tcctgacaac	cacagcctac	tcttctctca	300
gaaatcaatt	caaagagacc	actcctgaca	ctttaatgtg	gagctgaccg	cgtaactccc	360
tttgctccca	ctatacccta	tttggatttc	catcctagca	tagatgttat	tacatactgg	420
actgtgaact	ttttgagact	agagaccaca	tgtcacattg	ccaacgtctt	tctgtagtac	480
aagctactac	agagtagacg	g				501

<210> 303

<211> 505

<212> DNA

<213> Homo sapiens

<400> 303

gggggttcac	tatatcttta	tgtatctt	ttaaatgttt	gacactttac	ataattgaaa	60
aatgttttaa	tgaataatc	agagaacaag	aaaatctatg	aatgaaaag	cgatggccta	120
aactaaaagg	tcaatagaag	agttggaaga	tggttgaaga	aatttcacat	accttagaat	180
gtgtgggact	ttaattatcc	gaaaataaag	aaaattaagg	aacaattcaa	gaggtttaac	240
taacatat	caaagagcag	aacttacaaa	tgttcaataa	atgacataga	ctttctcaat	300

actgatgaaa ggagtcttta ggttgaaaga gaccacacct catatatcat atgatatagt 360
 tttagaaacc cacactcaag aataccacta tataaatttc agaaccaccag gaataaagag 420
 tagattctaa agactcccaa agaggaaaag cagcttacac acaaaggact gggagtgaga 480
 ccagcaatta acttcatcac tgtat 505

<210> 304

<211> 577

<212> DNA

<213> Homo sapiens

<400> 304

ggggatcctg acctggaagg ggcctccctg gggcggcagg aagagcgacc acaccgcta 60
 tgcctgctga gcccaggccg agaggcagct gccaggctgc gtgccacatg cccctgccag 120
 gagggggcgt gcagttcatg tcttggtgaa atgtgccagg tgctgagcag agaagctcca 180
 gggagctgca gaccttccat gggacccaac aagggcaggc atggagctgg acccagagcc 240
 aagaagacca gacgacacaa atcatgcctt caaagaagaa cccaggagtt caacccaaaa 300
 tgctgatcaa cttgtatagt ttctgtctc cacctccagt tctgggaggt gaaggagtga 360
 ggctgggcgg tcccagcgcc tcccgggcct gggagaactc gtctctcttt ccacacaggg 420
 gctgggatga aggcaggcag gctaacattg cagtaggaga tttaggagct tcgtgtgtaa 480
 gggcgatgtg acacggggcc cctgtgcaga ggcctggacc agagccgcca ggtccccac 540
 gagcctccag ggtaatggag catcagaacg attccgc 577

<210> 305

<211> 447

<212> DNA

<213> Homo sapiens

<400> 305

gggtctttgc tctggctctg ttgatatttt gtctttacct gccagctgct ttccatccct 60
 ctatttcttt attagtttca agccttcatt taaatctgat ttctccctt ttccatgggt 120
 taagtacatg gacagaaaca acgaacatca ggaagagaag tagaaaaata cgggtatgag 180
 ttgcagaaac tacagatgag ggtctttagt atctagccta attttgaaat tgctttgaag 240
 aagggagcgc cttgactctt ggcacccggc cattttcaca gcagttccct tgcacgcaag 300

tgtgtgctca cgtgggaagc agggttggat gtgaagagag tgctagtaat tacagtgcag 360
 cagaatgtgc agagcaacac tgtaaccttc aaagttttta agccatttgt gcttaaattct 420
 atattctcag tggtagaaat aaccatt 447

<210> 306

<211> 614

<212> DNA

<213> Homo sapiens

<400> 306

ggggcaagag aggtaatgag gtgtcagact gcaggccctt gtaaggactt ctgcttttac 60
 tctgattgag agatgaagct attggaagga cctgaacaga ggagtgcacat ggtttgactt 120
 atgtttcagt agggtaacct tggctgtgct gggaatagac tgtagaggag caaaaacaga 180
 agcaggaaaa tgagtttgga gggtactgca ctaatccaag tgggagagga tgggtggcgca 240
 gaccagggtg gtggtggcag tagggtgata agggttttac atgtttcaaa gatacaccca 300
 ataggatttt caacagatga gatgtggcat gtgtaagaga gaagtcaagg ataatttcca 360
 acaacagcct atctgaatac ttgtcctttg ctttttaag atgatttata agacttcggt 420
 tagatttgta ctatggttta cttgtaggac tcaaaaccca aaccactga cttgtgaga 480
 cacttgagaa cagggactag gtttcattat tttcgaatca tccttctcac aagagcatga 540
 cacaaagtaa catactcatg gtcggaattt aacaaatgtg cacaagatga atgaatgaag 600
 gagtaaatga atga 614

<210> 307

<211> 684

<212> DNA

<213> Homo sapiens

<400> 307

ggggagagga gggagagga gagggcgcat ttttttcatt aactttcttt tttaataataa 60
 gcaaaagaca aaccttgatt ttagttctat gaacaatttg ttagtaagg cccagtcaa 120
 cttgattatt tttcaacaac tgtgaattta tataatgata gccattttac atgatttgta 180
 gttttaaatg tttaaattgt aatcagatta gttagctctt tttgtgttta ttaggggtaa 240

attacctttc tcttctgaag cgacaattat acatccatga ttgctttgac cagaatatac 300
 gagggtatcc gcaatccagc atgtaattaa attacaatct gagttaccct ttcttgaatg 360
 tgacattctt tccgtctcat tcctattaca atgtaatttt caccctgact taggtgttag 420
 gaatgcttca gagactagtt attttttatt tcttatatga ttttttattc ttacccatat 480
 tgtgtttttc cccaccccta gtacttacaa ccttttattc tgtggttctt gtgggattcc 540
 cgttggtttc catctgtatt ctacccatgc tgccctggct gccttgagag gtcacttctg 600
 cctttccagt gacaaaatgg tgtggtgagt agacttagat attgatcatc aaatacattt 660
 tattttattht attttgagac aaag 684

<210> 308

<211> 682

<212> DNA

<213> Homo sapiens

<400> 308

ggggtcaactt ggtcagacga gaggagctga tctcaattgg aggggtggtg ctggagggac 60
 tctgggcaaa taccacaaac aggttgctcc tgacagcaaa gagcaagaac tggggttctc 120
 ttctactaag tgctgacttc aagaatctgg tagcctattht atcactctgt cttaaacc aa 180
 acaatccttht tatttaagca gttcaaactt cagttttgca gggtttatat agttaagagc 240
 agctggctta catggcacct ctttgatctt tctacagaca tcagcagaat gccagtctaa 300
 cataggatga ccttgggtcca ccacagagca tctatcccat ttagccactg cccacttttg 360
 gatgctaaca gaaaacatca ataaagaaac tattctcagc taaatatagc tacaaaacaa 420
 gtgtcacagc tatacatatt acacttgtha tctaagtga aaggaaatgg caatttcaga 480
 aaagactgtc ctgcttcac ctcactcacc tctttgggag aactcagagc tgcaccacta 540
 gccagtacca ctggtttggt aacagagatt ggactggtaa aagcagactc ccggctagag 600
 gaaagggatc ctgacttggt ctccatcctg ttagctttcc atgcattagg ctacacaggg 660
 tgaaagaaca aatcagtcag aa 682

<210> 309

<211> 624

<212> DNA

<213> Homo sapiens

<400> 309

```

gggcggatgt gaaggaggag gcaatgccag caggagatcc agcaacactt tcacttcctt      60
taggcttctt ccctttctac ttctggccga cgtaagaccc agggatgctg ctgtgctcaa    120
ggccacctca ctcttcagt ggacacaggg ttagcttgge tgctgcttc ccatttcctt      180
accaccagcc ttcacatccg ccggggcctt tcagcttgge tcactgcaga ttgcaaccgc     240
ttactcagcc tttcaccctg tagcaatcat aggtaacagg aaggaagcac atgctagtta     300
aaattgtaag aacttagctt ttctattctc atccatggta tgttcccact ttacttgagc     360
ttgtgacaaa agtcgccccat gtgttaatat gccatcttgc tggagaggca tctgacctg     420
ccaggctttg ctccaacttg cttccagcaa agctccttag gacttctaata cttatttggt     480
aaaacaataa aacaaaacag aacataacct tgtatcccat ctatcccaga tggagaagtt     540
cttgaaaatt gtccggccca cttctgcatt tctactttca atatactttc cgagtatatt     600
gtctcatata ttttgaagga gaga                                           624

```

<210> 310

<211> 549

<212> DNA

<213> Homo sapiens

<400> 310

```

gtgtgtgtgg taatgactag gttaatgtgc agcgaatfff aattaagaat gacagaaatg      60
taaagttcat acccatagtg ttagggtaaa ctaaaaaaaaa aactttttta aaagacaaat    120
gacaattaaa agtaaaaata taaatagttc ttgtgttttg tatttaataa tgcaaagata     180
ccagtgttta aattcttgaa attattgttt tttttttctc tttagtctct taatccttgg     240
tttgacctta atcttttcat agtctatatt cactaaataa tagttgataa atccttgaaa     300
tacttgtttt atatactgtg gatatgttgg atattttctt ttgatttctt ttttatattt     360
ttgaaatata catgattatt actatttctt gtttctctgt gaaacatttt attgcctaag     420
aaacagttca gtgaaataat gttttcagtg atgtctgtcc agccagtaag tagtacacag     480
tattttttgt ttgtttttca agagaactag tgaatacaaaa actgttttaa tttactttac     540
gttaggtac                                                                549

```

<210> 311

<211> 482

<212> DNA

<213> Homo sapiens

<400> 311

ggggaagacc taacattggt ttgctttctt agaattctca gaagccaccg ctgaactgac	60
cgtctcattc acaaacaag tcttcacaac tggtagagta ccaggcattt catgctcagc	120
agaaaggagt gtgaggacgg agctctctct tccattatct aagcctgtag gcttttaacc	180
acttcaccga actgtccgtc tcttaccaag aaagtccttg gtgtgaggct agagcatggg	240
tgcagagtgg agctctgggg ttcagaagga ggagcatttt gggtagatgg gccatttcaa	300
agatggcgga gccaaaggct tggcgggacg accgccatcc ctacgcactg ctcccaggat	360
gaagtcctag gctttggact cggctgtgat ccaggatatt aatctcgctc ctactgtgt	420
ccaggtagag cccatgctcg gacgcacaca gactgtaggc acctggacat agcacatctt	480
ct	482

<210> 312

<211> 478

<212> DNA

<213> Homo sapiens

<400> 312

gggtagcct atggaaagaa gggactacat gacattaaga atgctgagct tgctctgttc	60
gaactgagcc gagtaattac cttggaacca gatcgccag aggtatttga gcagcgagca	120
caagtgagtg tggctttctt tttccctctg tcattattgg attagttgaa tctcaatttt	180
tttctatta ctttattatt tgtaaatttt aatgctccct taaaactctt atgtttttct	240
atgtcggtag ttaatgcctt taagcatggg tgaaattaat agaaaactat ggactgagt	300
atattcctga actaacatag aagagtaata tttagtagta aaatatgtgg ttgaaaatat	360
ttagtagtaa aatatgacgt gtactacttc tatagatatt cattgaaaaa tataacacat	420
aatatttgtg ttatatatttg aaaaatataa cacagaaaaa tacaacacac aaaagaaa	478

<210> 313

<211> 572

<212> DNA

<213> Homo sapiens

<400> 313

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ggggaaaggt atgggggtga gatttacttt ttaaaacttt aacttggtcc tatgtgaatg      60
ttttacttgt ttaataaaca atgaataaat aatagttgag tagaagagat ggaaaattac      120
acaaactttt gcttacttaa caagccactt acctaactag tattttttaa tgacatctaa      180
aagaaatggg attcaaatga ggtctccact atgtaaccaa attgtcatta ttactttaat      240
gagttttcta tttaaactct ttattttttt tatgttagtg gagagtttta ggaagctaata      300
aaaattgact tctttttatac aggtatgtca tagcacttaa tttaaagaga atatttttaa      360
gaaagaacaa aaccttggtta gtaagccctc tagaaataag tactttatgt gcctagagtg      420
ccatctcttt cgtgggtactt aggatcacag tgtgggtggg tgagtttgac ctaaatatca      480
ggcattcata cagggttctt tttcttgata catatatatg tgtatttttt ttctttccct      540
cgaatcttag aaatcattaa tactgatgag tt                                     572
```

<210> 314

<211> 672

<212> DNA

<213> Homo sapiens

<400> 314

```
gggataagga agggagcact gccaaaggaaa caccttgga aggttccctg taggaggaag      60
tatctaagct ggaaactgct ttgtaaagta ttctgttaga aagtaaagcc attcctggct      120
ttacctttta acacccatca aacgtgttat ccagaaagat aacaaagtac accagaataa      180
gaagttacct aatggaaggc tttggaaaac cagagtacac tgctcaaate tgctcaaate      240
tgctaatttt agacaaacag aaaatacttc agtgagcacg ctaccaaagg gtatttttag      300
agtctgtttc agttaaccac tctgaactcc tcagtaggtc aaacaaaaaa aaaagcaaaa      360
gaaagaaaac tatttcaaata ctatagcaag tagaaaatta tcttccttct tcatgcctaa      420
tttctttcat cctacataga aaataaacia tcagcattcc atagctaatt ccattctaca      480
cctaaccacc ttatttactt agtacttggg gaagaaagtt gactacagct gttacttctc      540
attgcttata ttgagaaaac actgaacaat gtaaaacaca tatgagcaat aggcaataaa      600
ttaagcacia aaaagcatgg ctccataaaa aagtgatcat ttaacataac tttttccttt      660
```


cattactttc ta

672

<210> 315

<211> 678

<212> DNA

<213> Homo sapiens

<400> 315

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gggggatggg agagacaaca gctccacact ctacagcggg tcacaactgc ttctccttag    60
ttgcccacat ggctaaggca gaaagggttt aaacttagct aaaatacata ttttgattta    120
ctttagaaac ttgaactggc cccaggcaaa taataactac atgagaatat ttcatttagc    180
accttcctct ttcactccct ttagggaaaa gactgctgca ctcgaaaatg agggggaggg    240
aaacttaaag gaaaaatata ttcgaacaac agccagagtg gggaaggtag gcacacattt    300
ctgagccaag ttccaagccc ctgttgctcc aatttgcctt tgaacaatt ccactttgcc    360
ttctgttgct tgaacaataa ttattaaagg tatcaattaa aagtgcccaa ctccattgct    420
cccatggcca aagtccttg cactctccc gccattgcct gcagcacctg ccaccaccct    480
gattttctgt gtcagtgggg tagagccagt ctaggataga gcctcttctt tggttgattt    540
aaggctggga gaagggccac taccatggc cctgccgcag tgaggaagga aaagcagagc    600
cttttctgcc atctctaagt agctagcatc agtagcctag tcacaacaaa tgcactgggc    660
tcagtattgg gaagacag                                     678
```

<210> 316

<211> 411

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 316

```

gaaactgaac tcaaactgga gtgtgacacc aggttggctg ccttcctatc tctggggaag      60
tgaacagggg cttttcttgg gtacaagtga gagaactgag gcagaggcca gcccctgatg      120
atgacagccc ctgngtgacc tttgattccc atctgaccct ccttctgttt ctgtcactcc      180
actggaagct actgtcccc atagtctttt tctgtgtcac atgactataa caacctccca      240
tgtgttgaaa gctaagggca ggaaacacgt ctgttatgag ggaaagtgct tctcctggga      300
ctttgaagat ttttttccta caaggaagcc tgtctgcagc cttcacaagc actcgccctag      360
gctggaaagt tctgttaact gatttacaac aagctgtgaa tattagtcag t              411

```

<210> 317

<211> 559

<212> DNA

<213> Homo sapiens

<400> 317

```

ggggatgaag ttgaagaagg gaggatggac ttggagaaaa acctccaagt tataacttct      60
caaaggcagt aattagagag tatctcctct ttgtctctga ttcaggactc agctaaggcc      120
cagcaaattg gaaacttcct ttttaaaaaa agccagtgtg gtgctggcag tcattaaaga      180
tttgctgaat tactgacctc ttatcgccca catgccctgg ggaatctgtt agcagtccac      240
cacctcttgt cactaatcaa gatgccttta tgttaacacc tcccttttaa aagcaagtca      300
gtcaggaaac ttaagtagat taacacttaa tcattaatta cctcatggga taaccaaca      360
aatttctttt ctgttttaggc tatctctgat cttctgcccc aggatatatt tttcaggcat      420
tgaaggactg atgtgagtta ctctggtagt cctggcactt agggctcttg tgaatctgct      480
tggggaaagg aatgaaggca tggaaacagg acagaaaggt gaagctagag cagagaaaaa      540
gcactgaaaa gaaacttca                                559

```

<210> 318

<211> 537

<212> DNA

<213> Homo sapiens

<400> 318

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gggcaacaga gcaagactct gtctctttta aataaataaa taagtgtagg gacaaacagt      60
cactggaaaa acaacttagc tggatttctt ctttatttta catacaaaaa taaattctag      120
atgggaaaat gacctacatt taaattttta aaccaataaa tattagtaat aaatgtaagt      180
cttccagtta aaactgtgga ctgaccacac atattttatc tcccctccct ctgaaagcat      240
tgctaaaatg acagtaaagg aataagaata cacagctcta gaagcgaggt ttttagaaga      300
aaaaactgaa actgatgttt gtgtattcaa aacatattta aaggcataag tcagagataa      360
tggaactctt gacaaaaatt agcaataggt tcaatgaaaa ccaggtaaca aaaagcaaag      420
caaacaaaaa caaagtcaat tactaacaaa aggaaaaaaaaa tttacaagaa aaaagaagat      480
ggatcagtca ccactactcc atcacagcac aaaagcagtc acagacaata tgtaaatt      537

```

<210> 319

<211> 450

<212> DNA

<213> Homo sapiens

<400> 319

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gggatttcat gtacctgtaa aaaagtatat ggctaattat tgtttttaaag aatcatcata      60
caaaattact ttccttgaaa aacataagta tgatgacttt gtacaacagt aaaactacag      120
taccctttat aaaaacaatc ttatatcaac ttccaaataa accagacagc tgaataatta      180
aatagagatg acaacatatt ggtgcttacc ttctctaatt attaacctct attgtttacc      240
tatggagaac tgatattata attttaaata agctctcaaa ttctgattca aatggactga      300
ttaactgcaa catatcagtt tatttaaaca gttttaaatg tgagcaaagg aaaaacttaa      360
atattaataa attatacaac ttatagcact ctagtgctat acaaaaacta ttacttggtc      420
agagaaagaa agagaaaaaa aggaggagga      450

```

<210> 320

<211> 400

<212> DNA

<213> Homo sapiens

<400> 320

```

ggggcaccac taggacctgt cagctaaaag cagggcagag tggtgaggaa gaaagaggaa      60
tcggagatgc ctctttgatt tcctccttac ttgtccgagt aaatgaaaat caaaacaagg      120

```

gaaggaaagc aggttttaga aaagcttgag ctttgggata ctgagtttat ctgtgtaaca	180
accaagtggc tgttgtcagt atgtgggtga agagatgtct gtgctagaga taatgggttt	240
aggagtgatc aatgtgtggg ccacaatgaa agccttcagg tgtctatcca ggggtactag	300
agagtgagaa gagggcctag aacagaactc tgaagaaaat tatgtttaaa tgaacagcaa	360
tacctggaac ttatcttaag ccattagctc tgttatctac	400

<210> 321

<211> 418

<212> DNA

<213> Homo sapiens

<400> 321	
ggggaacatt aaagagtcaa agatgatgat gtccatgcta aggtgtctct gagagggtgt	60
tggtacgatg aacagaaata tgaaaactag ataagaagtg atgtgagagt agttctatct	120
tagtgatact aagtttgaag taaactgatt tttatatgtc taactagagt ttatgccatt	180
tgtagttaac aaaccaggc aggaattaat ccaggtcact ctgagtgtga gctttaaatt	240
tgatttcctt tatttacatt gttaatctcc atgtattcac tgcagaact gtgcattttt	300
atattttagt atttttccct ttgagtttct ctgaaatgtt ttcttctaaa agtgtttttg	360
catctttaac aaattctgct tcaactggctt ttttctttta aaccttgaat tttcttca	418

<210> 322

<211> 446

<212> DNA

<213> Homo sapiens

<400> 322	
gggagtttgg aagctgaaaa gcacatggat gagtaacaac tgaatcagtg cccccagggc	60
acctggcctg agccacactg tgctgcgaag cccacaagg ctcaggaatg ttaaaattct	120
ggcacctttc agggtcgccc aggatctgct ggcaggagat ggggttgag gagggggcgt	180
ctccaggaaa gtgaccagcc tggaggaaag atgcttgggc actgaaggga aagagcacct	240
cagagtgaac cacaggccac acgcctgcct gagcatagca ggcagtgccc cggcctccaa	300
tccgcagaag ccacagcggc gcggccccc cctgccattt gaaagacaaa ggccaaaacc	360

agccacagag gccaaaatcc aaagatgaag gttatgcaag acggagactt tttctatttg 420
 cttttcttct gagacagggt ctcgaa 446

<210> 323

<211> 687

<212> DNA

<213> Homo sapiens

<400> 323

ggcgcggtac caggcgggca ggcggccacg ttcttcagg actgagcgtt tcagcaccag 60
 gaacagcgac tccgccgttg tgcgccggg accagagttc tgagatcctg tccgctccaa 120
 tccctgcctc ttaggactcc aggatgctgg cagggacgca agatttggtt cggctggtg 180
 atccctgcgt atttcattca gctaccggac tccggaggct cagcaccgg ctgcgttctc 240
 agggcattgc ggtcccagga gctcacggt cctgatccc agcgaacggg catctccgtc 300
 accacgcagc tcagcgcagc gcagctctcc tcacacgttt gcagaggcga agtcctgcgg 360
 cgctggcggc gcttctgttt ttgtccctgg acaattctct ccaggatgta tgagataaat 420
 agagcttcta agtctgaggt cgacagtaga tgggtcttag gtgtcccaa agtcctgaa 480
 atatgcaaaa ttctgtttac ctgcgttttc ctagggagaa ggtccagggc ttgatcaca 540
 ttctcttcag cacacatgac cgcaagaagt taaggacaat gggctcagga gaggcagatg 600
 gtggtttggt taggagcaca ggtccacga ttcaaactc gattctgaga attattagtc 660
 gggcaaactc gggcaaatta atctttc 687

<210> 324

<211> 409

<212> DNA

<213> Homo sapiens

<400> 324

aattaaaaa aggcgcggt gacctattca ccctccactt cccgtctcag aatctaaacg 60
 tggtcacctt cgagtagaga ggcccggcg cccaccgttg gcagtgcac ccgaaaatga 120
 ctttcacgtt cgagtggcgg aaccaaacca tgagaatttg caacagggga ggaaaaaaga 180
 accaaaactt ccaaggccct gctattttgc ttaaaaagca cttatgcgat ggaacgcgtg 240
 tttgtatttt ttatttacat ttatatattt tggacatatt gctaggggtga accattttta 300

atgatgtccg gataaccaaa ccacgccatg gagcgttctc tgcctactt ctgactttac 360

ttgtggtgtg accatgttca ttataatctc aaaggagaaa aataacctt 409

<210> 325

<211> 725

<212> DNA

<213> Homo sapiens

<400> 325

gggataactt caagggtgaa ttctcatttc ccaactgctca ttcagctgct ttggtgacac 60

agggtgtgcaa gaacaacagt caccgtctat cgggtcatgac tatgtgaggc gagcagggaa 120

tgcctgaaca acgtccaaac actccaatct ctgttaccct cagatagtca aagaggaagt 180

gtcaccattt ccttgaagct tgggtgtttgt cacagccttc aaggaagctg gggatgcctt 240

gaagatgggg aaaataccac ccagaattca aagtgataac tctttgaagg gtcaatggtg 300

ggaatgaaaa aatgcttcct agcatttttag aatgccttgt accatgggaa gaaccagtct 360

atgatcctgg atgtgtactt ggtcaagtct gcacttacag aagcatttgg agaattttaa 420

agcatccttt tctttaaaga agaagacaga agaagttcag tggaataaca tggtagctga 480

atgcaataca ttttagacca aaaaatacca aaaaatattc atgtgtggta acagtaacag 540

tctcttcaag cgctcaaaat taccagacaa aactaactca tttgcaagct gaatggaaga 600

caaacattat cttctttaat acctagctac accccttcta gacaatttgc ctcttgcata 660

aacagagaca cagtcgtcaa aaacagggtta aaaactgggt aacaataaat gaccaagaa 720

ttaat 725

<210> 326

<211> 624

<212> DNA

<213> Homo sapiens

<400> 326

ggggggcagg ggagctctat ggtctagata gctggcagga agtcctctgt gaccogagaa 60

gggttagact atggggcttg agaagagtgg tgaccctgag gccagctgt gcagagagtc 120

ggagaagaga gggttgactgg cacattttaa cagtgtggaa caatctgacg cctctggtca 180

ggacagaaaa atacaaattt ggggagaaaa gaaattaaga acccatctaa gccaaaggac 240
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 gaagggactg ggaaagagtc ctggctggta agaaaagacc tgcaggctgt taggatcaga 360
 gagactgcaa gtcctagaga gctgggggag tgtaggacca ttacgtgcgt agagtcaagc 420
 ccaggctgat tagccatggg aaattaattt gacagcctaa ccccttgga aaaaaaagg 480
 catttaataa ataactcaat tcctcagtaa taacaagatt ccttataaac cagaatgtta 540
 cgtcaggaaa aaatgtccac tgaaattaag tgatcttttt tgaaatgttg agtactatgt 600
 gtttagtgat tacaaaagaa aaaa 624

<210> 327

<211> 775

<212> DNA

<213> Homo sapiens

<400> 327

gggctgtgct tttcaaggtc aaactgcaaa caaagcaagt ctgctctcat agccttggtg 60
 acagtatttg aatacgcctg ataataaatt tgttcatatg ttttccgtga gtgaaattaa 120
 tttcttgctg gtgatattgc aggttatata aatacataat actcttcttt cacctcttcg 180
 catattatca aacaatccac atttgacttc ataacatttt gagacagtct acaatcatca 240
 atcctggata ttacttcaca gctaaagtac ttactactaac aatattctga ttgtgatttt 300
 atctttatgt tttttatcat atcaacaagg gaaattatgg gtttcatgaa accataatgc 360
 aatgataaaa acataggaca agatggaagt ttttttattc tgctgaaaac atattttaata 420
 gcagtctaaa cacaaaaatg taaactgctg tcttttgga aacataacac agggtcacaa 480
 ttttgtaaga taaaagtttc aagttatttt aataaattgc cacatttttt cttatagaaa 540
 aatgacccat atgcctttgc tttttaaaaa aaaaaacaat actgggtatg acttatgtgc 600
 tatagaagta ttagccatta ttactgtatt attatccctt ccaccagata gaaatttctt 660
 attttgact actgtttgat gttataaaat tctattaata ttattttggg aaggcactct 720
 ttagtgaaga cacatcagaa aggcaaaata gttaaaaaaa aaaaaagct taccc 775

<210> 328

<211> 454

<212> DNA

<213> Homo sapiens

<400> 328

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gggagctctg tgttgtagaga ggggtggttgt aagggtgggtg acaggaacag gaaggagcac      60
ccaccagata agttaatttt cttccccaag tttatggttt gaacatgttt gggcctggct      120
gttacgtccc aaataggaag taaaatgaga aggttgtctt atgagctgcc agttgagggc      180
tctggagagc caggagtgtt ggaggaaaga gcttggaact tctattcagt gaggctggat      240
ttccactctc actccacccc ttcctcttgg accctgggac caactcaatg atcctttctc      300
taggacttgg ttttctcacc tgtaaaatgg ctaagcccc ctgcaggggt tgggcacctg      360
ggcttgcttc tgttggaagc atccccccat ggctcccaa gtgtgagatt ttcagactag      420
ggcccaagtt ccaccctatg gtacggggaa ggta      454
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<210> 329

<211> 422

<212> DNA

<213> Homo sapiens

<400> 329

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ggaagagtct gtgttatggg catcacatgc aacttaagga aaaggaagaa aaacaaacac      60
tccacagctg agaaaatgca tgactttttt gtgcggcggg acaaaaaata aaaataagtg      120
atthttgaatt aactgtggct aactagcata tgaagaacac acacatgcta ttaatcgact      180
gataagaatt ttttaacaaa agttgtcttg gtgcgggtggc tcacgtcttt gtatattcac      240
ctgctggctt cctgctctct gaggtgcgg tcatgcactg ctaagtgact cttcagaggg      300
tgtcccaact tacacttccc cctaaaaagt gggacagtgc cctttttag aactctcaac      360
atthttcttct tttatacttt ttggtttgtt tttgaggctt tttttctttt acttttattt      420
tt      422
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<210> 330

<211> 547

<212> DNA

<213> Homo sapiens

<400> 330

gggggtggag agatggggag aggggtccta gataaaccag gacaagggtg ggtcacccaa 60
attagtagtg actggaatac aaattacata ctccaggaaa tgaaagggtg gaactgcttg 120
gtgatattta agttttacac ttatagttac tggtaacaaac cacatgaaaa ataatacaat 180
gttttaaaac tcttgctctt catgcttttt ccccataaaa taatttttga taactcaagg 240
tttattagaa cataatatta catcatagca aaatatacaa tacttacaaa agactagctg 300
cttcctggaa tgcattgaca gctgctggaa tatcccccat caccagatgt ttctgtccta 360
aaccaatag tttcttagct tcactatcca catccagact gcaaaaaaaaa gattttttct 420
agtgtcaagt actgtttaaa tcagtatttt ttgaatacct gctacatttg agcaatagtt 480
tcatttttta aaacttttgg actactctgg caaggcctgg ctaacgcact tatttaccat 540
cacaaaa 547

<210> 331

<211> 539

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 331

gggctcgcc gcaactcaagc tcgcgctgct gaggcctcgc ccagtcagc ccacggagct 60
gctccaactg tgtctcctcc tccttggcgc ccgccgcacg ggaacccacc gaccaacagc 120
caagctccgt cccgcgcggn nnnnnnnnnn nnnnnngccg actcgtggcg ccctttataa 180
tgccggagcc ggggtgccaca tcgcaacaaa ctgcacactc attggctgct caagtccgtc 240
actcaaccta gcttcagcgt cccattggcc gccacggcgc gcgcgctcta gacctgggcg 300
ggctttgtcc tcattttaga acgcgcgcga gtccggccgc tacggagggc tcccgaagcc 360
gggcgggacg gcgccgggtc cagggcggcg ggcagctaca gcacatcggt gggagggcct 420
aatcggattg taagctcgtc gaggccgctg gtctcttgct ctgcaggact ccatccagc 480

attgacagcc tccgcctccc catgtcccaa aaaaaaaaaa aaaaaaggcg cgccttaat 539

<210> 332

<211> 608

<212> DNA

<213> Homo sapiens

<400> 332

ggggaaataa ctattgatcc agaattgtat gctcaaataa aaccataatt caaaattagg 60
ttcagataca tataatattca gacaaaggct gacagtttac cttttgctaa agagctacca 120
aagaagcaaa ctgaattaat aagaagaaag aaagtgggat gcaactaaga aagaatgctg 180
agcagtggaa ttggttaaggc tgtgagcagt gtaaaggaac tttagctata taaagcaaca 240
acaataataa gcaacaacaa atacaaaacc aaggtagaaa aatatactat ttaaaaataa 300
catgaaggag gtaagatgcg ttaaaaagat ggggtaaatc tctctaaagt ctttgaacta 360
ttcaagaaaa gaagattaat tttagatgta agtatgctaa gtattcatgt taaaactcta 420
aggatgtcac tagaggaata gaaccagaat atatcacttt tataccagag agtgagaaat 480
aaagaaaact taacctatta aaatatagga agagaaagaa agaaacatag aaaaagcaag 540
gtaaataaaa ggtacgggat aaaatgattc agtaactaca aagaataaaa cctgccagct 600
tgagtgaa 608

<210> 333

<211> 674

<212> DNA

<213> Homo sapiens

<400> 333

gggctctgag aaccagtgtg ggcctctccg gtagaagctg ggatgttact gtgtgtgccg 60
gtagctggca cagtgtcaat ggcttgggcc tgcacagagc tccctgtgta gacccacag 120
gcctcacgtc tgggaccaga aagctctgtc cccaagccga ggcgagcagc agagcattcc 180
ctgctggccc agacccatgt gtggagggag gtgcagggga aagggaacct gggctctcagg 240
ccccattcat gctgccacag gggctggctc ccggagctgc ggaggccgcc tggaagctgg 300
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aggggcccta atcccaggcc catgcagagg accctctgag aggctgctgg agttcaggga 420
ggggccctaa tcccagtcct gtccagagga ccctctgaga ggctgctggg gtgttgggca 480
ggggccctaa tcccaggccc atgcagagga ccctctgaga ggctgctggg ctgttggggg 540
aggggcccta ggccaggcag gccagggtgat aacttgggtt gtcaaagcct gacattggcc 600
agtcttgagt gtttaaaaaa atgtttttta tttctacagt ttgaatttta tgaatagctg 660
tcttcttacc tata 674

<210> 334

<211> 811

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 334

gggaggtgaa aaaatgaatc aaagctccat ctggagctta tcaatttgga gatgtctttg 60
tgacactgaa gtaaagatac caataggaag ccaagcgcac gaacctagag aggcctaggc 120
taaaaatcaa gatacgggag gaggtaacag gaggtacgtg gagagaaaac aattcctgtc 180
tcagtgttgt cttatttcat tacaagaaaa tattttttgga ttactggaca ctgttaagtg 240
cccatttggt ttttcttaac atgtctgac tcaaacctaa gacttttccc agcaaacctc 300
agctgttgag ctgtaggaag catgagaaag accaacggta catgggtcat ccacaatgga 360
aatttttgtgt ttacaaaaga cttctgtaaa tacaaaatta tttttggaag acagaggaaa 420
aagaggtgat ttcattggaat tacatcaaaa aagaagagaa gtgagaagcc aggagggggc 480
tgaaagataa ctcatcttac ccaatgggga caaaggacac aatcacactg tgcccaattc 540
cattaccgct gagagcctgc cacagtggac tggggaagga ggggaagtgc agagaaaatg 600
gaaacactat gagctaggca acgtaggacc nnnnnnnnnn nnnnnnnnnn ngtccatgga 660
tttaagccta tttatggaat aaaatcaatt taacagtagc tttccctgat ttcagagtct 720

cctgaaatac tgtttagttt gtgcacaatc tcaaattcca cagcatgtca ctggagttgg 780
agaagatgct gggaaaataa tgagcttctc a 811

<210> 335

<211> 483

<212> DNA

<213> Homo sapiens

<400> 335

ttatactgtg tctatcttct catgtaattc tcctagtaat tctaccatgg tcattttaca 60
ggtagccaag gtaaaaaact agagaggttc aaggttacat gctagtata taatagggat 120
ctgaactcag gacaaccaa atacaaatta agccagtctt aattcaaact ccttggtca 180
ttcaacttgc tatgcogtgc cgctgtctta gggagccaaa aagacctgtg tatgcgttta 240
aacaaccaa ttaatatatt acattagaaa accagaaagc aattaatctg ttacattatt 300
ttcctttcat aaaccagaat ttatggccag tatgccttat tatttgagtt gtggttctta 360
aatgggtcta accttttttc atcaaaaaac aaaactaatg attatttcag acaaggtata 420
atactgtcat tttggttact taaacagaaa ttgaggaata tgatttcata gaattagatg 480
tta 483

<210> 336

<211> 441

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 336

taatacccta tacttacaag atccccctg ggtgtttctg atgggcagct aggtttggga 60
tgggcagggtt gagaagagaa aggaacaacc tgcagtccag tctcaacgtg gccatctgt 120
atltaccatc agtgccaacc ctctcaccct ttgtggggga agggaggggtg gccacccag 180
ctgcaacagg tttctggggc acctgggggt ggagccggcc aatgcaaaca gtcaagagg 240
aagatggcca cctccacatg ggcagttcca aagcagggt ctggctctgt gccacaagag 300
gccactgng ctccaaaacc aggaaaagcc tttcagaaag cagtttgatc acactcatga 360
taggatacat caaattaagg atgacaccaa gctaccaaag tctacctgtg gatggccaag 420
ttcagcagcc acgcagcata g 441

<210> 337

<211> 755

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 337

cggggaaagt ctggtattcc aagatggtgg ctggtcattc tcaagaggag gactgcattg 60
cccaggcagg gctggtcate tgcagggaca gctgagggtg actgagtgga tgacagtcta 120
agaggaaact ctgaggaggc acctgagaca tcaaaactgt acccaagcta ttcaccttgc 180
agaaataaat tgccttttta atgtaagtgt aaaactatat cagttgagaa atataatcat 240
tatatttatt ccagcaagaa tttgattcag aaacaatac aatagggtgct catttcttga 300
aaagtgtaga atactttctc ctcaaaaaca acaaaaagc acgtaacatt ctagtgccca 360
caatcactaa caaaggttta ttttnnnnnn nnnnnnnnnn nnnnnnnnnn tgtaatatatac 420
tgagaaattt cactgtagaa acaatttctg ttattattaa catcatttat attcatatac 480
ataaaacca catcttataa tcaaagtatc ctcttttatg ttgacagggg ccatacttta 540
gacattaata agatcaggta tccattcagc cctctttcct aaatcatttt gcccaaatga 600

gaatatataa atgagtttta tcctcctcca tgaacgattt tccagaatca aaaccagtta 660
 tgtgataaaa cttaattcct ctaaacagat tttgtgtttc gagtttcaaa atgataagga 720
 caatctgagt ctatattctg gaatagcaat taaaa 755

<210> 338

<211> 554

<212> DNA

<213> Homo sapiens

<400> 338

gtgcacgccc agcacgtgt tcacccacta ctttgcacac ccatggccgc tgtgcacacc 60
 tatggctact acgcacaccc acagccactg tgcacacaca ccaacactgc acacttatga 120
 ccaactgtgca catctgtgga caccaggcac actcatgagc ccatgtgate cacagcagct 180
 gtcatgcacg cagttgttgc acacgcccac gtagacacaa tgcccagtcc tcatttgtct 240
 ccagtttcac acaaacacca gccgttaacc tctctctcgt caccacacg cctccaatac 300
 aactgttcct gctcagctag gtggcgtgca ggcaacgtca ccattggagc tgcccatgga 360
 cgtcttgctt ctgcacggcc atgctggagg tggcagacat gtcagcgtcc ctggggaagg 420
 ccacctcacg ggcagctgca acagggagca tattggcctt gcactgttaa tagcatatct 480
 tgccattaaa gtatgtaatg atgaaattgc aatatatctt tcaataaaat ctctgatgta 540
 ttcttatatc acaa 554

<210> 339

<211> 589

<212> DNA

<213> Homo sapiens

<400> 339

ggggtagaag tggccccacg caagtggctc aagggccaaag ttacaaagtt ttctgggttt 60
 taagtactcc acgtgaagtt cctcccagtt accccttata tggatgaagc atttggtttg 120
 tggctaacta aaggctaagg tgaattggcg ccctctgtgg gtaaagggat ggtcgtctct 180
 gcttggctca gggccaatct aagacactct ccctttccag ctgagacgtg gtggaagggg 240
 gagggctgta gggagagtag cctttgatct tttgctgctg gggcatgggg agatgggggt 300

tttccttttg ttttagcttt agacctttga ggcttgctgg ctgtcaggac tgcgatccac 360
 aactttacat tctcaaactg aaagaacatg atgattattg tggtgccatg actgatctat 420
 gtggtagctg tggaccttgg tgttgctcca tgattcagca tgaattgggc ttacgttcct 480
 gcctccagac cctattctcc tgccttgctg ctagagactg catctctctt ttatctggta 540
 actttatcta tcatctaata tgaactatcc tttcagccaa aatccagtc 589

<210> 340

<211> 478

<212> DNA

<213> Homo sapiens

<400> 340

gggagattct gcctcagtgg gcgtggaagg gaccaggagg gggtgtgatg tcgggtgtag 60
 gtagtgactg ccagcatctc ttgagactgc acatcacctc gggtcatgca tgcagctatt 120
 ccgagggtcca agcatcttaa gattctaaaa aaaaaaaaaag gttacgaaag tcatggatac 180
 tgagagatgt ccttgaaatc tgacaaaaca agtctcatga atatgtgagg ccacaccagc 240
 aaccaactgg tattgctggt tcccttcctg ccccatgtgc tggcaggggc cgttgcaata 300
 gccacgtcat gaaggcagag ctgcgcattt tccagggtgt ctccagctgt gggcatgcat 360
 ttcccttctg tagcgttcac cctctacact gggttcggca agtgtacatg cgagggcagc 420
 ctatcacgcg ttgcatctgt cttctgcaat actgaaacca tggcttcggt ccttgcta 478

<210> 341

<211> 437

<212> DNA

<213> Homo sapiens

<400> 341

gggttgatgat tctgtggtga gaatcaattt catagatgtc aataaactaa gaggaggatt 60
 aatttagact ccgaggctga gcatgacagc tattttgggt caagtccaca tttcattcct 120
 aaatggactc tagctgaccc atcctttccc ctggtctggc tccttaccct tcattctgag 180
 ttcagcatgc tgagtttggc tacatgccta tgaagaagca ctgggctaatt ttctagtctt 240
 ggggccttct ccctccccct gccccatcac cccactgttc attataaaag ccaaaaaaca 300
 tggaagagaa tttggaaaca catcatgcag aatcacgccc ctctcacagc aagaaatact 360

gtttggcctt cctcttctgc ctggatccat gcgtgtgatg gctgaaccgg gacactctct 420
 ttatggctca tttattc 437

<210> 342

<211> 470

<212> DNA

<213> Homo sapiens

<400> 342

gggttttctc ctgggaacat caccagaggag aaaacctgca gccctttatt agctatgtgc 60
 ttgggaagag aaacctcctc aggtgagact gtttttctga acttcagaac cctgaacact 120
 taacatccta tgccttagga gaaagctatg gtcaggtgct cactcagctg gaagtgtggc 180
 caccataagt acatccatta ggactatgag cagtactggg agctgcacac cactggcctt 240
 agagttcttc tctcacatac aaatgcctct tttgattatg aatgttaaaa tttttgtgcc 300
 ttgtttaata attctgaata aagaggccta ctaaaataca taaaaacta gagaaatgct 360
 ttgtagacc tttttgtatt ttgacagtca caagtccatt gttgttgaac gtttattgag 420
 ctctaacaat gtgacagggtg ccacacaaaa cattagacac agtacctgcc 470

<210> 343

<211> 426

<212> DNA

<213> Homo sapiens

<400> 343

ggggaccctt ttcttcctgg gttcatcctc agggcccgcga ggagcagccc tggtcctctg 60
 ctttgttctc ttctctcgca tgtagtcatt ttgatcaatc acatcctgtc tgtgagtaca 120
 gcagacccat cagataggaa agacctgatt ttctctctca agtttatgtt acaggtcaga 180
 tttgattacc acttcctctc aagacccctt attttaggtg gcaggagaga agttggtgga 240
 gaaataagag tggagtcac tttagtata cgtagtgcct cagatttccc aagcactcaa 300
 gagtgagtgc ataaaaaccc aacaccagag ggttggtcat atatcatatc catataaaaa 360
 catgtcaatt tgttgaattt ctctaataa gtaattaaaa taatattgat actgtttctg 420
 aagatt 426

<210> 344

<211> 555

<212> DNA

<213> Homo sapiens

<400> 344

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ggggaaaaaa ttgtatcatc ctatttccac tgagattctg ctgcatttaa aactctcggt    60
ataagttatg gctttatata aagcacaggg tcattttatc acagtaataa gaagtaagaa    120
gataataagg aataagaagg ggatatgaag aacctgctgg gagagaaatt cattcctaag    180
tatttcaatt ataattattca taaatgttct aggatttctca ggtagccctg aaaacaataa    240
ggaatgcttt agattaacat gaacacttca agtaciaaagg tcatgttgaa ttcattcatct    300
gccagagtgg cagacacata aatcaattag aaaatattat acatgttttg ttctctgagg    360
ttttcttctc taaacctcca atttaattgt gaagcccaaa ctcatcattt tattaactcg    420
tgtattcgac tgagaaatat tccatgagca cccatctaca tccatgacac caaaagtctt    480
catgaaggtc atatcttcca tagtcatatc taaatgtgta aaactgcagt tgcaatggta    540
tgagaaaact ccaat                                                    555
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<210> 345

<211> 710

<212> DNA

<213> Homo sapiens

<400> 345

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gggtaaattg tgatattaac aaccaacaga atatcagaat agtaaaagta aactatggcg    60
atgtgcaaca tcatttttgaa tctcaggaac atgatgaatg taaagagcaa gtcaggtgaa    120
atztatataa agttcaaaaa catacaaaag taaataatac aatgtttaga ataaaactac    180
tgaaaaacca agggaatgat atacacaaaa tttatgacaa tagttacttc tgatggttgt    240
atgacagagg ataggacagt gagacactca cacataatgg aacatctacg tgattaaaac    300
atgtattgta acttttttagg gagggggagg gaagttcagt gatgtttctc ttctgtaaaa    360
gtagatgggg gatatgataa ctgggtctaca taactgattt attcacttta ttctttggag    420
aacaatgaat ccattttttg tgaattaagt tccaaaacaa aaatgaagtt gtatttctaa    480
gaaccctggg gttttgtggc ataaaaacaa ctatactaga tggctctttat gacagttttg    540
```

aggcctaata gtatgactct aagattaatt atctacaaac ctaaggaaaa aaacagtcct 600
 tcatttcaaa aagttacatg atatgagata taatatcatc ccaagaacaa ataagttggt 660
 aaaaaatttg aaatagtctc tgatctcccc ttcctaaagc acttatgctg 710

<210> 346

<211> 670

<212> DNA

<213> Homo sapiens

<400> 346

ggggagaggg ataaaatgtc aaccttaact tttcaaaagg atatattggc tataatataa 60
 cttttcaaaa ggatatataa tggctatgaa atagccatta tattcagatc acaaacaaaa 120
 aagaactgta atgatactct aatctcttat tcaaattctg gccggggatg gtggctcaca 180
 cctgtaatca aatccatgaa gtcacaaag ccttaagatt agtcgcagtc tttcacgtca 240
 ctttccaaac tttttgttgc tttattataa tgtttgacag aactaaagtt tttccagcct 300
 tgacaagata attgcttcca tatcacagta gaattgaaga aaaaaaaaaat acacagccct 360
 gtatctcact gacaatgata aattgtcatc agataatata atctcacaag tacacagtac 420
 cagtagttgc ataattttta gcatgaattt tctaaatagg acttcaacca atttttttta 480
 tttggctgta tccttggtag gggacagttc ctctttacga aaagtcctga aggcataagg 540
 tgctttttaa ataagttaca ggtataaatt gtgaatccaa acccacagtg gatgccacaa 600
 aactcatgtg ggtttcaata atagattggg ataaggcatg tccttaaaaa gaatccatga 660
 ttcagtttag 670

<210> 347

<211> 671

<212> DNA

<213> Homo sapiens

<400> 347

gggagtttaa aaaaaaaaaag cattttccca cttaaagtgg aacaatttga agagtcctga 60
 gtatatcctt aatgtgacta tgtggaaacg ttggtgtgat ttaggtgtga gtactcatgg 120
 ttattcatta ggcagtttta actgattttt attttttagtc cgtaatttag tttttacctg 180

taatttcatt ggtttgaaat tggaagcatt aggaaacttg aaaaatatat aaaaataata 240
gcatttgccc ataggtaatc tttaacctac atataaattg tgtttatctg aaaagaaaat 300
tctccttaac acatcaagat gtcttttata gttcaatatt gtgcttaaaa tgacaaacca 360
cagtgatgat tttatcaaac ttgtttttca tttataggga ataaagacca tccataacctg 420
aagtgtggta ttgtcagata attgcttatg agttgccttg agtgcatttt attatctcat 480
aaataaacgt gcttgtttta gaaacaagga cgtcaagttt taaaaataaa tgtttaaaaa 540
agtgggtcat ataagaattt cagacattaa atcataaaat gttttttgtc tatttttgtt 600
gttgcagcat gtggttaaatt gtcagtccac agttcaacat gtatttgggt ctcaaagcaa 660
acagtgtgcc g 671

<210> 348

<211> 574

<212> DNA

<213> Homo sapiens

<400> 348

ggggtggatc ggtaggaagg cctgggcttt ctttgtttag ttggtgtggg ctggggctgg 60
gctcagtga tgcgcccaag tgtgcaccgc gcggtcagct gcccggcgag gtaacagctg 120
gcacctgtgc gcgaagtga gcctgcatta gcagcatcat tattcagcat tagagcatta 180
caaagataat tactgcgagt tagaaaagca gaggacagag ggaattgaaa cccagacccc 240
cttggcttat caaactccca gggtacgagt gtaatttcaa gcagctttgg gaaagccacc 300
tctcgcaaag ctgtgagtct gccacgttaa aggggacgct cagaagaccc cacagctgga 360
gccagtggcc caagggtctt ttccaggtt tcatcctggc tcaaagatca aattagtgtc 420
atagatagga tgctgaagg catcacacta acattttctg gtctccaaag cagttctact 480
tagactatca gaaccagcct ttttaaattc agaattaaat ggggtcaaag gagcagagca 540
gggtactttg tctttgagta acaatgatag cctc 574

<210> 349

<211> 433

<212> DNA

<213> Homo sapiens

<400> 349
 agtgaccaat gaaatatcag tgcaatagaa aagcaggatat aaataacacc aactggtaat 60
 ttaaaatatt tgttttaaaa aacaagatga agcaggagag gcaaaatggt aactgaaaac 120
 taagtgcacag ctacatgggt gttcattata tatcttactt taaaaagtta tgtccaagta 180
 gtggtaatac tgaccaatgg tactttcaac ttggcatttt tgaggtgtta ctagataagc 240
 ggaaaaagta gcttaaaaat coactgcaac cacgaatatc taaatcaca tccagactaa 300
 caagggcgat gcaatcctcc tcctcttggg gacagtttat tttttaaaat ttactttggt 360
 cttgggttatt tcaaaacaca ttttaacctg gtattttgcc agagaatctg gctatcagtt 420
 attttatgtc cag 433

<210> 350

<211> 523

<212> DNA

<213> Homo sapiens

<400> 350
 aagaagaagc acaatccctc ttcccccaat agaagaaaac agccaagcta gcacctgcac 60
 gtgtgggcct aaatcttcct tttctctttc tacaaagctg ttcacacagt atcagcctcc 120
 ccacatttca aatgtagaat cagttacagc atgaagaaaa caaaaaataa gagctgcttc 180
 agccagagac tctagaaaca agatcatttc catagcatct cctgttataa atgcagactt 240
 cagtcactgc cccagagact gaactggcag ggtaggtagg ggacatgacc caaaaatatg 300
 catatTTTTT aggaagaagg agctgattta cctgctcatt caagttaaag aaccacagat 360
 caacagaaag gaccaattcc ccattttgtc ataaatgcta acctacacag tagtttcctt 420
 aaagaaaatc acttacagag cagagttgta cactactggg ggcaaaaagc cctgacagac 480
 aactgactct gctaatacct gtgtgaaaaa aaggggagat tcg 523

<210> 351

<211> 434

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 351
cctcatcctt ttccccacat tagttccttt gcttttaaga aaactgctaa aatacagagg 60
aaattgactc cctcattcaa ttaaaaacac agttattgtc tactgggcca ctatgtacag 120
atgtataggt tgttccttgc tgaagagaga ttggtgactg gattccagcc cataaannnn 180
nnnnnnnnnn nnnnttctgt ttctaatttg cacaaagggtg ctacatgtgt gtttcagaag 240
tgacaaaact gggctttgcc cacatgtagc atgtagcttg tatctcatgt ctgaggggaa 300
aacagacaag taatcaagaa ctacaataca tattttaaaaa aaagaagtaa aaaaacccta 360
caatacatat aattaatgct agtctaaaga aggcactgca agaacaaaaa aaaaaaaaaa 420
aaggcgcgcc ttaa 434

<210> 352

<211> 440

<212> DNA

<213> Homo sapiens

<400> 352
taccaaagag acttgtgatt tcagtatgtt tggaataag gggcatgaaa ctgcatctgc 60
agagccttca cataaaactg agaaaacgtc agttggacac atcagagaat ggggggttgg 120
gtgggctgac agacacttgg ggatgcctaa atccctgtcg cctaccctc taaataccac 180
gctggccatg tcatttctta ctgacacata aaacagtctc taaaacaaga caatgtcatc 240
actttaatta aagttcatta ttgatgttta aaagaaaaat actcttggct ggcaaataat 300
gaaccttagt tgtgatttca gactttctat ctatattgag aaatactgga aaacaagaag 360
aatcctcatc ttcaaaataa gaaagaagaa tggattccgg aaaggagaaa gatagagggt 420
gcctgacatc ttcctccttg 440

<210> 353

<211> 523

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 353

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cggtggcggc cgcgggtagc agggatagaa gtggggagca gatgagatgg atgctcatga      60
gtcacaggta ccctattaag aggcaggact gctttttctt caaggaggcc catcctagga      120
ccctgccagt cagtgccata atttttctaa tagctggcag ggctggcagt gagacatttg      180
caagctttcc ctctgtgcct tcttatgacc gagggcacc atttgcctga atacagagaa      240
ttcatgggca ctctgtgaag gaagggtgg ccagatgcca ccaacagcac caaccaaaga      300
gagaaacaga gggatccaat cacactctcc aagccactgg cctgngaagg ggaaaggaca      360
gacaaaggtc atagctgggc ttggtcacag gaactgacct ggagctgctg actaagggca      420
tcttgaagga tgtaattacc ttcctccctt ggggccccag aacaaggaag ccctacagct      480
gaaaaacagt aattaccagg cagatcgaga agacagcctg gga                        523
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<210> 354

<211> 557

<212> DNA

<213> Homo sapiens

<400> 354

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cggtggcggc cgcgggagaa aaaatgtact cacgatcgta tctggggaag gtctgtttct      60
at ttgtgac ctgtatttct aaaaatttga atagcagctt ctgctacctt gtcacctcc      120
attcttaggc actgtaacaa ggactcatat gtctctgcag agtggaacga ggtaggatgt      180
gtaaaagaca gaacctgaaa aaacagatac agcttttagaa gtacagacaa tggtttttaat      240
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ccattaaaaa agaattactt cccgcaaaag aaaaaaaaaa tttaaattctg gggtaaatat 300
gctagctaca cagaatagag atacatctcc tagccgtcct tgcagttagt tatggctaata 360
cagacattat cagaaatact gtatgggtgtg gtagcttcca gttattcctt gacacaacta 420
acagacagcc tttgtcctat tttcttcttc acctcttagt ctactctgct acttagaaca 480
caaaacacat ggctcctttt ttatggaatg tgatttaciaa tattaataac tattatcagt 540
ttataaatat attgtat 557

<210> 355

<211> 562

<212> DNA

<213> Homo sapiens

<400> 355

cgggtggcggc cgcgggtgta tgctgggatg gctcccacca tgcgaggga caaacagact 60
tttgtctagt ctaaccctca ttatacagag aggggaactg aagccaggga acgtgttcat 120
gacttgccca gtcccgaatg gaaatcccca attaaatgac ttcaatgaac tacaacggaa 180
ccaagtcaga gcctatagtt catggccact cccacagga caggtaacca aaggcagaaa 240
gagggggagg caaggagggt gctgtggccc tgcaatggcc tgactctacc tcctgtcctc 300
acctatttcc caactccccc tgttggatcc tgccctaata caaaatttgg acatgttggt 360
ccttgaagat tttgggggca ttccgtttga attttcaaaa tattgatcat gataactatg 420
ttttgtgatt ttcttaaaat ccatgcccag ggactccctt gccttactcc agtgcaagtc 480
caggacaaaa accagccact ggcccactgc tgaagggtgg ggaagggtgac tgagagacga 540
gagatcagtc ctgcttgctg at 562

<210> 356

<211> 460

<212> DNA

<213> Homo sapiens

<400> 356

gcggtggcgg ccgcggggga atagtttcta tacttgagga tcataccaga agtagacagg 60
ggtgggagct tcaagacaca attcgagtcc aatcaacaga taacagggtt ggctgagatt 120
ggtggtggta aaaataaagg aaagtgaag gattcaagaa ctattcaaaa attttaatg 180

agttaatgat gcctagactg aggactgatt taactggaag aaagtgttaa ggagtattta	240
ccaggtttct ggcttcacca attggatgaa agatgacatt taatgagaca aaatcataaa	300
actaccaagg tgagggtgga ggggagtaaa gctcatgagt ttctgttttt aattaaagtg	360
aatctgaagt gcctttcaga catccaagtt gatacaacgt ccaagggcta agaatgcaag	420
ctctaagggtg tgattgctgg ggatgaaatc ccagtctgcc	460

<210> 357

<211> 594

<212> DNA

<213> Homo sapiens

<400> 357

cggcggcggc cgcgggagga aatttttctt taaatcttaa gagcctttta taaacgggat	60
attttaatat tttaatgtta ctacatttaa aaaatagtgt ttctctacaa aattttctgt	120
attcagtata cgttaactat gaaaatgtca aacaatgaaa tcattgaaat atatttaagg	180
aaaaattacc aacccaaaagt aatgagtacc ctctatgtgc atatttactg gaatgttcat	240
gtgaaatggg aacatttcca ataacagcat tttgaatctg gggtgacaca aacatgattt	300
ttatttttga gctagggatt ttgatggaga agcacctaga tgaagacacc atttcattca	360
tgatatttta aaattagaaa agtaaagctt ctaaattgaa actcttaaca ggtcacttca	420
tgaaattttt agtttttaa ttaattttac atgagatgtc tttctgaaga gctactttta	480
ttaactttca cttagatcgt tgtatgctag gcattcagta tttctctact tgattttcct	540
atgcctagtt gtgattacag caagtattta ataataaagt cagtcatgtg agag	594

<210> 358

<211> 698

<212> DNA

<213> Homo sapiens

<400> 358

gggggtgggc gcagggtggt tatgaccggg tgggtccacaa ggtgggtcagg acctcagctg	60
gtggctgggc ttgggagggg ctggcatgga gtcacgggcc accatcccct aagtgtttcc	120
ataggcaagg ttctcattcc cctagtcagg ggaggggacg ggtacagaga agcgcagcaa	180

tgagccagga acagagctga gatgaaacct cagcctcccg tcttcagaat gagaattaat	240
ccacagagga gctaaggaaa atgccgggca ccgagttgac ggggtgagggg tgtgagccat	300
gtggccggca tggccgcccc accaccagct ccatcctgag cacttcacag acatggccct	360
cttcatccac acaactgccc caggagccac tgaatgaggc tcgatgaaac ctcaactcgc	420
gttgcagcgc acgtctgata acactcgcct ttgatcactt ttatcactgg ggatcctgca	480
gtcagggctt tgtgtctgca gcggtccctg ggaaacaatc tacaactcga agctccacca	540
aactcactca gagtcacaaa atttctatca ctgactgctt tcctccaagg cccaaactgg	600
atttataaac ttccaaagaa aacttcatat tgaaaaagcg atgtaccac agcattgtag	660
aacgatgttc acaaaggaaa aacaaggccg ggcgtggt	698

<210> 359

<211> 667

<212> DNA

<213> Homo sapiens

<400> 359

gggatgcttc taaaaagtaa atgtgctgac tcctcacctg ctcacacggc taccgagga	60
tgattttcac atcccttact tgagacgaag ggatgttggc actctggctc ctgcccatgc	120
ctcccttttt cttccaccat cccaccct ctgctgtccc tgcttcagcc atagtgagct	180
gctctccgcg gcttctgtgt cccacttttg ttctctctc caggctgttg tacttgctat	240
gtcttctgcc ggagttaccc ccagccttcc tgcattctcc caaacttggtg tccccagcaa	300
gttccttctg agccctcaga tctcagctca ggtgctgect cctctggaag tccttctcag	360
atttctcatg acaccatgag cctctgtgtt agccctttt cacactggat tgtgtgctag	420
actggcacat acatcccccc caccagccag ggagcaacac gaggtgctc ttggtatacc	480
cagcacgggg acgggtgtgg ccagaggcca gggaatgctt aatgaatgaa tggggacagg	540
cagcttttca gcagcgaggc taagggtggg atctgagtag cagggccgct tgctcatgtc	600
acctaagtgc agggcagagt gtctcccagg agggaggggc tcctcgtatc ttctcttggtg	660
ccctggtt	667

<210> 360

<211> 415

<212> DNA

<213> Homo sapiens

<400> 360

gtctgaaaca tggaccctgt cccttgatga gttgacacaa aagatatatta caaatatcta	60
acagaaggaa acaaatgact tgtgggttaat gagctaccac atagagagat ggcttggaat	120
agtagagaac ctttcatgga gaaattggga ctccattgaa ggatggatgg ataaaaatta	180
catgagtaat gttttagggt agtagttata taatatattgt ttttttcctt catgattctt	240
tcttttttcc cttttcttct ccaggctacc atacctctac taggtatggg gaagacctta	300
aaagcaagga taagcagcat gaatagagct agaatagtaa aaactagaac attttaggat	360
aactaaaatg ttggaaaaag aaagcatggg ttgaggaatc attccaccta ctgtt	415

<210> 361

<211> 643

<212> DNA

<213> Homo sapiens

<400> 361

gggatccatt gttgagaaat gctttcacta ctggttcaaa caaaaaactt ttcattatgt	60
agcggttgta aaactcatct tttaatccaa taatctttct tttaaaacga agggcacctg	120
aaacacagag gcatggttgt ttaaatcaca taccactctt cdatacttta gacttaccaa	180
acaaaaataa ccatcaaacc aaaaaaact gtttaacaca tatcaataat tatttatgat	240
gtttgcactt ccggaactgt gaacctaaag ataaggatta tgaaaatgtt atcagaaaaa	300
tgtcttctaa aagtagtata tgtcatcata gaacacaagt cttagaaagc cagaaaaatc	360
ctgaaaataa accagttact aatgacccaa atgtaattta catctaaaat aagagctaag	420
acaaatgaat gaacctatca cactacttaa gatgaaaaaa ttcaacatga ccttttatat	480
ccaccttaat agaaaaaacc agtgttttat tagggcaatc cactgtataa tttgatcttc	540
aatatTTTTg gacactctta ttatTTTgca ttgtagttca tggaatttta tttatttTgTg	600
gatgtggctg tagaaaggcc atcaaccac aaaaatctgc atg	643

<210> 362

<211> 712

<212> DNA

<213> Homo sapiens

<400> 362

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gggggagata gatgaaattc gcaagtcata ccaggaggaa ttggacaaac ttcgacagct      60
cttgaaaaag actcgagtgt ccacagacca agcagctgca gagcaggtaa tgggaaactg     120
aagcactttg aaaatagagg gaagggtgtga aggactcaga gagaaaagct tctgggtttct    180
tccttacoct ttaggatgac atttctcata gctgatactc tcactttgga gaaaggtaga     240
aaaagtaatc cagatatgtg caggagagcc aggaatcaaa tggagaatct tctttctttt     300
tttaaagctt agttaatatt taattacata agtaaaaatg aaaaatagtt tccttacaaa     360
aaaaattcca aacatggtaa ggccaaaacc atcaaccatt ggacaccatc cttcaggcac     420
attatcatcc ttgaaaagaa gggattgatt taggtcatca ggaagggaac cagggatagt     480
ggcaggacac agctggatct ctagtctgtg caacagcaac ctttctcatt ataagcttaa     540
aatttatatg catacatttg ttttaattaga gtgcattggc gccctcaatt tgaccacctc     600
tgggaatttt ggtgaaaaaa agtttctgaa cctataaagt ttagggttca gaccctgaaa     660
agcagtgatc acatggccct gccctccagg gacctatcta gataggcaca ct              712
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<210> 363

<211> 699

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 363

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gggaggtggg ggaggaggag gaatagatta tcttctagta ttttccaaat gttctatatt      60
aaacatatat taacctttta aacatctact tttgtttgat tctcaaaata atataaaaca     120
ctactatata atttaaaaag aacattctaa tcttaataat ttcataaaag gaggtcacag     180
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ttcaagttgt aggcaactat aaaaatttcg ctcttgaaca accaatgaac atatacatga 240
tttgaaggaa aaatccctnn nnnnnnnnnn nnnnctaatt aaagagaacc ttgaaattaa 300
gtaaatcaat tcctgacaga aagacgaaga tgttttctgt aatacaagaa agcaagatca 360
cctttgcccc agacatctaa tgtagtagt taaacgttcg aattctggaa taaaaaactc 420
agcaaagtct aaagtatgac tctgggtgcc aagaaaatgc cacaggaact agcatttcca 480
atcagcagct cctgagatca ggaagactgt tatgttctat gatataaagt ccacaataaa 540
atctgttagt ttttctggtt aaatgctcat gctaaaaata gtgactgctc aaatattaag 600
taagaagact tagttttgcc ttcttggtca gtcctctgaa ttccaggcaa ttggttttcg 660
atatcttggtg acaccaatac ttgacatcta acagcattt 699

<210> 364

<211> 661

<212> DNA

<213> Homo sapiens

<400> 364

ctaaagacct cacaactatt ctaactaagc tgaaagcgaa gacagataat gtagttcaag 60
ctaaaactga ccaaaaggta agaagtagaa ttttaaaggg tactactgaa tgaattaaat 120
agtttttgga gtcagtttta cttggggata taggataaaa accttttagg aacctttttt 180
aaaaccaaat agtaacagca ggtggtaaag aaattttgta actgaagcaa cacagatcct 240
cttacataat tgatcattat aattgaacag tattaataaa tatacatgca tgagtgtgta 300
cgaaagaaga gcgtcaaagg actaagtgat gatttaggaa tacaagtata taaattccaa 360
actgaattgt gtccttggtg gctaaatctg tgttcttcct ctgttgatga gttcaggagc 420
tctaatecct tttgggtggg gcagaaggaa aatgtagcc ttctcactca gcctcatagg 480
aaataaacac cagcattaca acatatectg ccctgccttt ccaaccgaag aaacaaaaat 540
gacctgatca tagtagaatt atagtagaat tattcattat aatatttggc ttgacaaaa 600
atcagtctga tctcgggaaa cctggagaaa tttattttct gtactctaata gttctttcat 660
t 661

<210> 365

<211> 546

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 365

gggggagaag gcaggcgaga gagagagagg aatatgcaca aaacctggct caagagtaat	60
ggtgaacagg aggggttgga caaagaccag cgaaactgga atggagagaa attaattgga	120
gtgaggccaa atcgtggggc tttaacaggta gcgtgtccat ttgattgata accatttgag	180
tgaccattct ggttgataaa atttgagaat ttatcaacc aaaccgtgat tcttgagagt	240
aaaagagggt gctgttaatt attaaacaca gactataagc atcagccagg acatatggtc	300
acctcgcttt tataggcctt gttaacagta ttatctcttt ttaaagnnnn nnnnnnnnnn	360
ngtgtgttta cttcctaata aaggtgtcag ggagttggtc caaaaaggac ccaaattgaa	420
ctcaaaggct gggtttttcc aaacggctag attgattttt tttttccga tacagatatt	480
agtgaccctt taacgtttta aaagtttggc ataaaaagat ggattttatt gtgagctact	540
agatta	546

<210> 366

<211> 503

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 366
 gggggaacag tcttttgaga ttagcggctt agattaggta cttaaaaaaa cactattata 60
 gggatatcatc aaattacatt tggtggccaa tcttatttct ctgagtgatt cagtctagga 120
 aagaaataac accctaaaga tggtcagata tgatgctaaa ggaattaaaa agggttgatt 180
 ttttttttct ttgctcagga ataaactgga attctagaag gtcaaacttc acccaaactt 240
 aaaaagatta annnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnngct aaaaaagtca 300
 ttagatcaat ctgacgaaga acttacgctg gctacatggt tagatacatg agtcgacttc 360
 cactaacgtc cgaagtggag tttaagagat agacttgcag gctgctatcc ttaacatgct 420
 gccctgaga gtaggaatga ccagggttca agtctgcttt ccacagaatc aggcattgctg 480
 ttaataaata ctggtttaat caa 503

<210> 367

<211> 477

<212> DNA

<213> Homo sapiens

<400> 367
 gggggacggg agtgagagca ggagcgacgc agagcagccg tcgccgtgcc cgggtctcag 60
 ggcgccctggc tgaagtgagc atggcttcag tggcctgggc cgtcctcaag gtgctgctgc 120
 ttctccccac tcagacttgg agccccgtgg gagcaggaaa tccacataag tacagcaaatt 180
 ggtttaaaac ttgcgctagg ctgtctggaa aactttgttt ttttttttta ttatcggtaa 240
 tatttggaag tggaattgca gaacatgctc ctgaacatga agaaccttaa aaaaatattt 300
 ggaattgcaa cccgaaaaag acgattttgt ttacaataga ctttcctctt gtgggggagt 360
 ctaagatata ccatgcatgt ttgactttt taatcgatgt acttgaatat tcattgagaa 420
 agtggacgtt tctgtaaaac ctgaaaagag catcttaata agagattagc ctgtaaa 477

<210> 368

<211> 543

<212> DNA

<213> Homo sapiens

<400> 368
 gggcagggct cccgcagggc cctcacgggg cagaacaagg agtcttcaca gaaggtcttc 60
 agtgagggag acacacaatc cacttacatc ttacaaagat gactctgcca gtggggtgga 120
 gaacagcctg atggggcagg cctcagggag agtaggcccg ggaggctctt gcagtcgtcc 180
 tgatatgaga ccgtcctgac cctgggtgag ggggtgctgag gcgatggggg gacacagctg 240
 gattcaggac attattatga atctcgctac catagtctct catttgtgga atggggggca 300
 ggaatgggga catctgcaaa ccagattctg tgcaaaagtg ctcttttcag ttggaactgc 360
 tcgatgaggt cgtgggggatt gggcttcaca tcttgattaa ttcaggggct ctagaagggc 420
 ttgctcttcc acctggctcc taaaaggctc tttgtcccc actacttcct gctgtctcca 480
 tccccagccc tgatgtactc tggccctccc gagaggggat gtgcacaggg ctgcaattag 540
 tgg 543

<210> 369

<211> 487

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 369
 gagatccggt ctgggatggt ctggggcagc tccttttcac tggacgtgca gccttcatac 60
 aggatctcag ttctctcccg cctccatag gcccatgcct tatgttcogt tcctgcatnn 120
 nnnnnnnnnn nnnnnnnnnn nggtgctggg gatgaatcca ggtccaggcc cacccttcac 180
 agtctcccca ccattggcct ggctgcttac cagtcactct gtttttcaact tccatgtttg 240
 ttactggca cctgggggatt ttccttttct ctttgacat tcagatgtct gctttgttat 300
 tgattccac atgaaacgct gccttgaaac ccattgccaa ccattctctac tcattctgcct 360

ggatagagaa tatgagactt cctgcttata aattcttttg gaaagttaaa gctgggtaga 420
gggaaaaggg ggtggccttt gatgtgtaag acaactggaa atctcccttt gtaacacgaa 480
tcctggt 487

<210> 370

<211> 511

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 370

gggggaggag gtaagaaata attttgtcca aaatattagg acataatatt aaattaagat 60
atactaaatc aatataagaa gagttcatca tagtttagtc agtgatctaa ctgctgtag 120
ataaaaactat tttatctgcc tactcaataa taaattttac agttttatct gcctactcnn 180
nnnnnnnnnn nnnnnnnnnn nnnctcatat gaaatacgta gaaattactg cccaaatgcc 240
aactacatta tgataatctt ctaaaagtta taattgccta atgttaaaat attttgtttt 300
ctgagttatt gccaaatgcg atacatccct agttcggaaa gatacccaac tactatactt 360
gaaaccactg aagctacaaa ataccttgct ctgagttttc acatttgctt ttctccctct 420
acagctttct gcagtggcat aagtggatta gttatactat ttttattaat tacttttagta 480
gtaatttcta ttaaaacaat tattaataac a 511

<210> 371

<211> 471

<212> DNA

<213> Homo sapiens

<400> 371

cacagaaaaa aattcaacag ttaaaatctg cttccttaaa ctttctaaaa aactaagaat 60
 taaaattagg agcaaagctt atcccgtgga agctacaggt taaagaacta ttaggtggcc 120
 tttaagggct acacagttaa gaaatctgat gggtgtaaac catgaagcac gtatctccag 180
 aaccagaaac aatactgacc tagaagctag actgaatttt ctaggtcaat ttcattgttca 240
 ctgtttttcag tcaaaatgaa ttagtgagtt cctcaaaaat gtcctgtgtt ttcccaattc 300
 aactgctgaa tgaagtcttt acactaatcc agggactggg gtattttgtt gctcatattg 360
 aaaactgacc tcagtaaagc ttcttttaaag ttcctagata tagctactaa ctttgccatt 420
 tatacataga aagttagctt taacttacag caaaacatgt aatcacatca t 471

<210> 372

<211> 480

<212> DNA

<213> Homo sapiens

<400> 372

ggggagcttg cgagattgat tttgtcagtt ttcccctcgc tttctcactg ctgctcccag 60
 atgctacttg ttcagaaata gcctgcatgt aaagagccca cacctcaggc aggaatgaat 120
 ttctggaggt cagaggagct ctggccccag gcatgctggc tgcgccccgt cgacacagaa 180
 cgcagcggaa gcaaatcagt taaatgcacg gaagtcaatt gaagtatttc cctccagtct 240
 gtcagctcta tgcacattga ttgggaggac cccttggtgt tcagaagaca gttttgccac 300
 caaaggccta actcgccctg aaaagtgcgc ttttctggga tttatggtag tgcacggaat 360
 ggtggaattc agtgggtgac aactgcatgc tgcagccaca aaggacaatg tttgcagagt 420
 gtgctgcgtt tcgcccagca ccaacattgt tcacctctgt gtctgagccc agacgggggt 480

<210> 373

<211> 444

<212> DNA

<213> Homo sapiens

<400> 373

ggggcctggc tggagtcagc gagatgatgg gtcagcaggc attcaggagg gtctggagaa 60
 agacgccaag agctcgcgtt aacgaagggc cagtggaaag aatgctatca agaggtctgc 120

tgtgagtggc atcccaagag agggcaattc cacatgggag tgaatgaaaa gactcaaact 180
 gctgctacac aggcattctg ggggagaccc tgactgcctc actgacgctt ccaactgtgag 240
 aaacactttt ataacttctg tgtctccttt tgaaatttta agacgatatt aatataatttt 300
 cagtcctaac tacataagca attcatgttt gttctaacag gctgggtaac accccaatcc 360
 tactggcaga gaaaaaaagt gacaccacag tggcacctgg agtctcgag ccgcgcactt 420
 acgtatctca gcagggttc ctcc 444

<210> 374

<211> 499

<212> DNA

<213> Homo sapiens

<400> 374

gttggctgtc tacttctgtg ctctgaggct ggcatacagt ccatttctta tgtgtgttca 60
 atcaacatgg gcttctgttt tttaaccatt cccattcttc tcccaggagc tgaggactga 120
 acccatggct tcctgggttg gccctcaggg ctggcctcaa gctgtggggg ttcaattctc 180
 ttctgtgtga tcagagaggt catagtttcc ttaaagcctc tgttgggatt tcccgaagat 240
 cccttctgaa cactctgagc agaagtcagg ctggcctaata gtctgttctg gggccccttc 300
 ttctctgact ctccccgtct catccatccc acgatgggac aggaggctta acgtgctcac 360
 cttgagacct ggtttttagag gaatagggag gcgaacaagc aatctgcccc ccgttggcca 420
 agactgagaa gatggagggc tgtagggcag tcaggatgag gagaacctgc ggaacataaa 480
 agagaggcaa ggggtggact 499

<210> 375

<211> 465

<212> DNA

<213> Homo sapiens

<400> 375

gggggagccc ctgtggccgg ctgcacacgt ggccttacag cattgtgaac ttgggggact 60
 gacagggccc tcatgctcca agctagaaaa ctgttcagtg cttgggtgtg cgcataaat 120
 atttattctc ctgcaggttt cattaccttg ctgcttactt aaggacacag cttcttctctg 180
 tggttccctg ttgtattctg ctaagagggg cagcagcgtc ggatttgtcc cttggcctgg 240

agtctggaat aactagggag agccttggtg gctgtgttta aacagggctc ccggggcagg 300
 ctagagatcc ctgagcccgg ccgtgtgcct gctgtggcct ctgcctcttt ctccccctca 360
 agctttgccc agggctctctg cacagtattg gtccagacat cctgcgagta tatctccctt 420
 taaaaaaaaag aaagatagcc acgcacattg acacatgcct gctgg 465

<210> 376

<211> 614

<212> DNA

<213> Homo sapiens

<400> 376

ggggccgggg gctgctgctg ctgacgctgt cgggtgctgtt ggccggcgggc ccctccgcgcg 60
 ctgcggccaa gctcaacatc cccaaagtgc tgctgccctt cacgcggggc acgcgcgtta 120
 acttcaagct ggaggcctcg gagggctgct accgctgggt gtccacccgg ccggaggtgg 180
 ccagcatcga gccgctgggc ctggacgagc agcagtgtc ccagaaggca gtgggtgcagg 240
 cccgcctgac ccagcctgcc cgcctcacca gcatcatctt cgcagaggac atcaccacag 300
 gccaggtcct gcgctgtgat gccattgtgg acctcatcca tgacatccag atcgtctcca 360
 ccacccgcga gctctacctg gaggactccc ccctggagct gaagatccag gccctggact 420
 ccgaagggaa caccttcagc actctggctg gactggtctt cgagtggacg attgtgaagg 480
 actccgagge ggacagggtc tcagactccc acaatgcgct gcgaatcctc actttcttgg 540
 agtctacgta catccctcct tcttacatct caaagatgga gaaggctgcc aagcaagggg 600
 acaccatcct ggtg 614

<210> 377

<211> 491

<212> DNA

<213> Homo sapiens

<400> 377

gggttctaag gagcagccag agagggagga agctgccag gaaggaggat gtagggtgaa 60
 gggagtttca gggagtggac caggtcagat gaggattgaa atgttacct cagggtgcag 120
 caatgagcag gtgacctcag tgaccttgct cagagccact gcagggtcat ggccgttagg 180

cagccagaca tagtgggttg aagagggagt ggaaggtaag ggattgagcc agtgggcgcc 240
acaagagagc ctgatacagg gcacatgtgt ttagagatga tggacatggt tgaatgctgg 300
aggagtggga gagactgaag atgcagaaac aagaaagccg tttcctcacg ggggtgcgaag 360
caagggatcc tcagctcaga ggtcctcggt caccacaaca gtgacttctg agtcagggcc 420
tgtgctgggg cagggagctg tagcccagaa ctcttcctga aggtccagat ccactggcct 480
gagtcaccac t 491

<210> 378

<211> 662

<212> DNA

<213> Homo sapiens

<400> 378

gggggtcact gtctagagac tctaggaaac cgctccctac tccaaaggga atttgcaaag 60
atgatggggc taactcccca gaggagagcc aggagctccc ttttccatth aacacacaag 120
ttgaatgcca gatggaccta gatctctgca acacgctgtg tagtggggaa gcctgcgggg 180
ctgggtggga tcacttcacc taatgcagca cgtatgccac aaactcacca cagcacacct 240
tagcctgcat caaatcctgg ccgctcctgt tctggagaca aatcaccact gttgtcatga 300
tgggtgacct cagtcacccc actccaacgc ccacctcacg gctgacatgg catgtggcag 360
gaggaggtat gtcactgtgc tcccagaaca taccataacc ccatccctcc caccatgca 420
tgtttatgct gggattgggc tgtgatgcaa aggtgccctt ggccctctct cggaagtaa 480
ttttttcctt catgccaca tggcaaaagg cctgcctctc ttggcatgag aatctctaac 540
agcctcagag caagccatgc tgatgatgag ctctgcgtcc tactgctca agcctaggtc 600
ccagacacaa ctcccaaaag tcaacaggct tttttttttt tttttaaacg aaacaaaaca 660
ga 662

<210> 379

<211> 512

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 379

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gggattcaga aagatcagaa aaatataatg actgtgtaaa ctatgcaaca cagtgttccc      60
tgtataaaat tgtataaatc catagagcac catattgata agctttatga gaagaactta      120
tctatttaca taatttattc tcctgttatt agtctactgt ggataataat tttaaaatta      180
ctatattccc ttagggatat tttaactgta agataatttt catggttgat tatattaagt      240
atagaatctt taaaagcttt tctgatttnn nnnnnnnnnn nnnnatttgc ttaaagattc      300
cctagaaaca tacacttcaa tgtatatata gaaaataact gtgaatactt aatatgtggt      360
attataagcc agttatgcct tgggcattta gattttcatg cttggatttt cattagtaac      420
ctgtagtata actgtatcct ttcttgaacc atgaatttaa gtgccacat tactggatag      480
tagagatgcc catattaagt aaacatcagt ct                                     512

```

<210> 380

<211> 458

<212> DNA

<213> Homo sapiens

<400> 380

```

gggcgtgtgg aggtcactct gctgccggat tctctggtgt ttccaggcag ccttacctta      60
gctgtcctcc attctcatta gacttcttac ctatTTTTTc agttagccat ccttgctgtt      120
ttcatatctc caatcaatag ccctactttc attgagattt tcattaatgt tttcaataag      180
ctcttctcag aaacatcttt tcttaaagaa ctgtgatcat aaagggaccc agaggcaatt      240
gtgatgtcac ctcttccggt tcttgagttg atatgaaagt tagcactcta taaagtgttg      300
cttgctttga ctccgtattc agggaaaatg tgacagtcag ccaccccagt agagccaaag      360
agcagtcagg atacaagggg agaaatcgag tctactggcc accatcccgt tcccatcagg      420
tgatagccaa ggtccagccc atagacacac ctctgtct                                     458

```

<210> 381
<211> 441
<212> DNA
<213> Homo sapiens

<400> 381
ggggctaccg gactaccgaa cgagggggcgg gaggagagggc ggagccgcag cgtggtcggg 60
gccttcccgc ggtgccgaaa gttgcctctc cgtgcttttg cggcgtgggc tccccttttg 120
cccctccaat gtttagcaat tgattttgtc tgaggattag tcttttagatt gtatcacttt 180
gtgtattttt tgtaaaaata gagcagttaa ttattctctt aaaatcgggtg aaaatagaaa 240
tgtacgtttt ttgatgaatc ctggtgaaca gggaaatttt tggcacagtt ggtttgagat 300
ggtagaaggt taaaccgaga aagcaaatgt tttgccccct cttcatgaga atgtggcttt 360
gcacatgtgt gttggaggag gtttggccaa aactggagtt cgcgttatac taggcccagt 420
tgtcgctgcc agttacagcc t 441

<210> 382
<211> 446
<212> DNA
<213> Homo sapiens

<400> 382
ggggatgggg ggaggagaga tgagctggga ggagccaggg gcctgctggg atctcaggac 60
agagttgcac ctatgaccag tgtaatctgt gcaggcacia tgttctcctg caggccctgg 120
gcttcaggcc tcagtttctt gcctgagaag tgggggaatg agccccgcg ccctgcctgc 180
ccactccaca tcacaggact tgctcatctc ttgccctggg tcatgccctc ttgctctggg 240
tcacttacat tttctgaaag aatcatggct gccttttggg aaaaatccaa gtaaaacata 300
cacatgggta aaaatgaagc tgaaaagctt ataattaaaa gtccctgcta tactccccat 360
tctgcactgt gcaggtaata accatgttcc accagatggg gtgtgccagg cttatgtctc 420
cttctttatg ggaccaatgt caggac 446

<210> 383
<211> 572

<212> DNA

<213> Homo sapiens

<400> 383

gggggaacac tgctactcct gccctgctt ttccgtcttt tcctgcagtg ttttggagtg 60
caccctcccc cgctgcectc actctcgctt gtcggcttcc aggcgcggag tccccgaggc 120
ctgagaaacc agtgtcgggg gagaatggga gaattagccc tgagggactg atacgtagtc 180
acggcgtagg agcttcccct tctccccgaa gtccgggggt ttccggttctg agggctagtg 240
gacctggtgg tagcttgaat cggaaaagac caagcataga cctagcgctt cttcccaccc 300
tctccatttg ggaagagtgt gaggtcgaca ggtgctgggg ttgtgtgact ctactgggt 360
ctagatccct gaagcgggtgc ccgggttggc agatccctct gttgtggctt gatgcgattg 420
gttgggaacc cggaactgga gactggtttg gattccactg ggagaataga gtttgaaggg 480
tggaagggtg ggttacctga caatctcagc tcaaggctc cctcaaactt tattgcaacg 540
tatttcccca tggaagcaga tttcttcttc at 572

<210> 384

<211> 591

<212> DNA

<213> Homo sapiens

<400> 384

aagaattcaa aaaaagaatt aggacaatta aaaaaaaaaa gaaagttagt tacatccagc 60
gtcttacaat acttgcaaac actgctccag gaccaatgtg atcaagtgc ctttcaggac 120
gagcattagt ttttctatta cagccatgtc agagtctctt ttctttttct gaaatatgat 180
tccctaaaga agtgggtgta agtttaaate ctgataagaa gaaaactctc aagacaagac 240
cccttgctg tgctaataag gggctttctc catttctggt catccctatg cccaaggcc 300
cactctgctt gaacaggact tatacacgtc ctggccacaa tactcttctt gctccctagg 360
aaagcaagat gtttatgcag gcctctgctc ttccacacca cagcacaagg ctgccaccta 420
cagaatcatt taatccattt cagcactacc caggatgagt gagaatcggc ttaaaaataa 480
atgctggctt ctgctgattt gacaaaggag cctactgtaa tacatgctgc ctggatatac 540
aagtttaatt ctcttttttag gaaaggcact gatgactact aaaataggac a 591

<210> 385

<211> 472

<212> DNA

<213> Homo sapiens

<400> 385

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tcctttgtca tcccgttggtg aaataagcag tttaaagaaa ttttggttat ctgcctcaaa    60
ggtgatgaaa agggaaggtg ttgaagattt agcccagcag attgattcct taaggttgat    120
tcctaagggtt gattccttag gaagaaaaag gtgtttgtat tggagctttc tcggaaatag    180
ttttcaaagg agtgcataca agaagcccc atgcttcccc caaaacacta actttaaaaga    240
acctagtgtg tattcggggc accctttatt ttacgttgta aaacatgtag ttttaattta    300
ccacgtacag cagagagaca tcagttgggt agggaatgga tggttatatt ggtgtctggg    360
accctgtgcc tttagaaaga atatgtttta actgctctta tcatgctagc tcagggtttt    420
aaaatgtgat ctgaataaga ccaaagtttc ttcttgcggt cttttcatgc tg            472
```

<210> 386

<211> 417

<212> DNA

<213> Homo sapiens

<400> 386

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gggataaaat aatttgtggt agatacataa ttataaagtc tcaatgtcaa aaactattat    60
ggaatgggat tagactatta aatgggaaag tacagcttcc tcccctggat acctttaaaa    120
gaggacaaca cttatctgaa ttagatgttc tgatgagaag caaagagtag gaataattta    180
cgagactagc acctagatga tcacagctac ctatccctgc tatcttacag cggtagcccc    240
tatctggatt tgtctctctt cagttatgat gacaagtggg tatctgtcat ggagcggccc    300
aagacttggt gagatcacc aatcagggtgc agtgtcacct gctatagcta caaactgctc    360
aagggtgtaa gatgggctgc tttgtttttc tctttttctg gacatcattt gattgtg      417
```

<210> 387

<211> 704

<212> DNA

<213> Homo sapiens

<400> 387

```
gggaaggatt tgccagagag ctaaactctag atgacttgca tcaatatttg attagataca      60
ttagctgggc gaactctcaa atgatcagaa taaacatgat tatgtcttaa aaacatggta      120
ttaaggcatt gttggacgtt ggagtgtatg tgtgcaatgg tticattacc tgcagaataa      180
tgaagtgttt cttcctgact gaaaaagacc atcatagctt cagctgatgt gctacattcg      240
aaatagcttt agaattccaa gtttgaatta ggcttgggtg tcaatctcag tctatgaatt      300
atagattaca gatagcaaat gactattgag atttttgggt caaggaaaat caaagaagag      360
caaaattaga aatattttta aatttgaaat ctgtctttta aaagtttgat ggattagcaa      420
ttgtatgcca tgtaattaca atgtctgcag agaagttgaa cttaaaatga ataggaaaac      480
aaacaaaaaa ttgtatgtgc ctgagaaatg ttgcaagtct cagaagcaca ctttgtgac      540
aaccaaaaat ggacagattt catttatttc atttgttcat atatgctgtt tggatgtttg      600
agttgttttc tctttgtact gaaatccaaa ttttccttcc tagttgaaat cctatcaaac      660
tgttgacatg ggctgaatct tatttgattg ctatgtggaa acat                        704
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<210> 388

<211> 564

<212> DNA

<213> Homo sapiens

<400> 388

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gggtaaaggg ggatttctgt atgttctcaa ccagtggtgc tctggagctc aacttagagc      60
tatttttagt ggtaccggaa aaagcaagtg cttaaaaata tcaagtctgt cattgactct      120
ctgtggtcac tagcttgggtg tggagtgggt ggcttccttc ccattcccat ttaaatttta      180
ggtaggtca ttgtgcatca gcacagaact atgatttaaa ggggacttac tgtgtttttc      240
ttttgaaatt gacaccataa tgttattttt gtgcctaata taagtaatta ctatgtggca      300
ataataaaat cattttcaga atactctata agtagctgaa aagtttcaag gtattgtgta      360
tttagcacia aagtaaacia tgcaaacaac tgtaaagtta gagacactaa ggaaataagg      420
tgtacagact tatgtttgct ccaggggaag ggtagaaag gattgggagt ggtgtgaaaa      480
gagtaggatt ctaccaggat tccaaaaaga atgcattgta actctgtgtc aggaatacaa      540
cattaatttc agcatgacac agca                        564
```

<210> 389

<211> 697

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 389

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gggagtgggg tggaccatat ctatggtaca gtcagttgcc actttcagta gttcagaaat      60
tatttaccaa gtttctgctc agcaccgggg attgcgttag gtactttggt ctgagtttta      120
tggtatttag gttcatgcct tatcttctcc attggacaca agcatatttt actaataatt      180
aaaaaaaaa cccaccgtgc ccgaccagat aattatttta atagaataaa aaaaagtaca      240
atggtgaaat gactgaagga aaatnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnac      300
tggtggtggc tgctgtttgg taactaaatg aacgaactga gtccagcctg cttttttcac      360
cgtggaggta gctgctaccc agtaaagtta cgttggttgc ttcagatcca cacttaggtt      420
gtagcagggc tgagctagca gtcaggtttt cctgttcctg tcttgtcctc tgacgtggct      480
tcagggccct ggaagggttct ctgctaagca cgcattccaga tgggtgcaat ggcagcccga      540
gcgtgtacac gcacacctcc tgttctgggg gagtggtttc ttggcagctt ctcaagggcg      600
aagggtgagt tttcggcatc tggccttccc ttgctgctgt gggtcgggtc attctagcat      660
cttgccatct tggatgatct gcagctgtca tctcgggc      697
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<210> 390

<211> 814

<212> DNA

<213> Homo sapiens

<400> 390
 gggggtggag gagaggcagc agttcagggc tagattatga tgcacagtat attgatccag 60
 tcccctggac aaaatcagat ttaattgtcc gtgctaactc ttgtcagccc ttgcccttct 120
 gtgacaacag gacaaacact aagattataa ttgcaattgg agttagcttt tatgtgtgat 180
 ttaaacggag ggtacaaact aattaatagg ttttaaaaat cttagtactt taccctctat 240
 ctaaattttc agtgtaattt gagcaagtat tggtaggtgg taaatggaga cttgccagat 300
 gttgacattg ggcttggatt ttgaaacttc ttccaaccag gaatttaatt acctggttgg 360
 tgttggtggt tgctttggtt tcattttacaa tgttaaattt ttaacaaatc aatgagagtc 420
 taatatggct atctggattc agagcatacc tccattgctg tagcagctgt gattctcagt 480
 gtaaaatctt tcagtttcta ggtaaacaaa gaatagtttc tttcggggca tctaagggt 540
 gattgctgtt tcctttgact gtgtattaga cagagtgttt tgggctctgg tcaactttag 600
 tagaaaacct agttttcata catacattta aaactgaatt tatggaattt gactgtggtg 660
 tattttacatt gtgagtggag taggcaaaaag gatcttttaa caaacaaaat atgtatttac 720
 ttatatgtgc attgaaatat gtattttccc atatacatct gatgtcctga taaaagctt 780
 actttttctc catgaaaagg aaataaaaaa cacc 814

<210> 391

<211> 505

<212> DNA

<213> Homo sapiens

<400> 391
 gggctgacat ggagattcaa ggcccagggt ctttcagacc ctccatgacc cacatcctcc 60
 actattcaag gccaatcca aatgccattt ttactggga gattaaaatt actgactctg 120
 tagctctaaa ctgcctgtta agagagagca actcccatcc aagcgcataa ggcctgcca 180
 acggcccagt tcctccactg ctcggaatag taaagataat taaataaatc gtctaaaaaa 240
 aacactcctg ttaaaatttc agtggctgct tttctccatg ttgagttccc tcaggacca 300
 gcatgtgtta tttttaatta ataatgacat ggttttattac aggattcctc ctatataaaa 360
 caaattaaca atctttctgc aagggaagag gaggaaggct ctcagttaaa aaagaaaagg 420
 tggatctctt ctttgaaaag gagagggtaa ccctaagttt cactgaggca tttatgagca 480
 tccttttttt tttttttttt tgaga 505

<210> 392
<211> 705
<212> DNA
<213> Homo sapiens

<400> 392
gggaagagat tatgagcaaa aataagttcg aaatgagtat tttcccttgt aacgtaatca 60
gtttgcagaa gaactatatt aggtccttta ttccattagg agccagggct tacaagcttt 120
tcaaatatatt ctgacctaaa aacaaactga ctctaaaata caaaaagcaa gctgtagtat 180
ctaaagtatt ttttaacaaa tgtcttccaa aatgttgaac aggtccactg gtataactcaa 240
ctcttaagct cccacatgtg ttctagtga tatggggtaa atacacattt ctatgacatg 300
atthttgggtg ggggtctcaca aggaaggatg gcttggggga ctgtggaagg ccgaaatggc 360
cctagacata tatccagtta ttgcttgat ttggaacaga tagagataaa atgtaaaaca 420
tcatcagatt tatggggaaa cagcaccacc ttgagcataa aattctggac tacaactgag 480
ttacatttcc agagtatcag ctataatcag gtttcacaaa ctataactga agtaatttat 540
tcagaacatt atacctctat atactatact tacaccaaag ggggagcttt aagctgttct 600
atatatcata aaaatatgaa tggtaacatc tctaaactct ccataggact caacgtttat 660
aataaaccag acaacacaaa tattatgaat taatttattht gacct 705

<210> 393
<211> 585
<212> DNA
<213> Homo sapiens

<400> 393
gggtgaagtc cttggggaga aaaggagcag gccaaagggcg atgggtggagt agagctgcct 60
ctcagaggca gcatgagctg agaggggtgat aggaaggcgg cgctagacag catggaggac 120
tttctactct ccaatgggta ccagctgggc aagaccattg gggaaggagac ctactcaaaa 180
gtcaaagaag catthttccaa aaaacaccaa agaaaagtgg caattaaagt tatagacaag 240
atgggagggc cagaaggatga gccggggccc ctttggaggg aaggagggag gactggctga 300
gggtgggtggg tgcttctctc tgthttgtag aacgatcatt cgatcattcc ctgctcccgc 360
tggcctggaa ccaagcaagc ccgatggcag ctctggagtg ggtcagtggg gaacagaggg 420

gttctgggag tccaggaaca ttacaccccc ccagaatgca agatgaaagt ggcattgaggt 480
 gaaagatcct cagaggcaaa acctgagcca ggctttcctt tccggcaggg gaacagagac 540
 tggcagaggg cacaaccagg gctggtagag aacaagggt ggtgc 585

<210> 394

<211> 583

<212> DNA

<213> Homo sapiens

<400> 394

tcagtttagga atgcttcaaa tgagcaggaa ttttatcgac tgaacaagc aatgattaga 60
 gcagagcttc acacgtttgg agccagtaca aagttcatga actctatctt taaaagaata 120
 aaacctcaca taaagtaaag cagtcaactt gtcagtcaag gcaatcagta agaggaatag 180
 taagagaaac tgaattgaca ggaaccctta ttcttaatat ttgccctat ccaactttta 240
 cttaaaattc taaaactggc tatttcgact ttacttttct aaccttttct gtttgtcaaa 300
 ttgacaggat cactgaaagc aattataaac gcacacaaag aaaataggag gacatgtgaa 360
 gaatagacat ttataactgg gttgaccaag ggcccgagtt cccacttgac accccatggc 420
 gaaactgctt gttgcactcc agtacatcaa agcatcatgt gctcaatggg gtgatagtta 480
 gaaaagtcac agtacacttg ctactatac atttgctaca taaactgcct ctccaggagc 540
 acaaagggtt ccaagaactc actacatgaa cgctgatagg tga 583

<210> 395

<211> 489

<212> DNA

<213> Homo sapiens

<400> 395

gggggggggg gttgtaaaag tcaattatgg taatgggtgt gagaactgag taagagtagc 60
 tgaccttggg atcacagtaa caggaggaag ggcagagcat gtgaatgtat atgaaggaag 120
 ggaggaaggc agaggtggga acttgtggca gttctcattg cttcccttta ttcaattagg 180
 cagcatgggtg accagcagag tgaggaaagg agatgaaata gagaaataaa gtaagtatac 240
 ttaatgggca ccctggcccc acctatgatt tgtagccatg agtttaaaca taataatgac 300
 tgtacttttt cagccaaatc tgggtggtgca ggcacagggc atggagaagg ctgggtctaa 360

ctgaggtggg atcacacaaa gctacactca tgagaagcaa tacaacacag gacacggttt 420
atattgctga acaccaatat gtcactttat tatttggatt ttttttccca tttgtcacat 480
acctgtcaa 489

<210> 396

<211> 503

<212> DNA

<213> Homo sapiens

<400> 396

gggtggccga tcacctcaat cttattaaga gcttaatcat cttggccctg tttcactgaa 60
acagattttt aagaatcctc ttctggtaga gacaactatt ctctatccat atgttataat 120
acatacatct gctataacta ttcttttaaaa ttaaccccca ggaaactgat tgaattagcc 180
cattaaatga tattaactat ttttattctc catctgacca ctggagctca tctgaccatt 240
ggctcaaaat aatgagcttt gttttggcat agctgttggg tttttttcac cataaagata 300
caacactttc tgctcattcc tgactcttga caataaatc atgccattag caaaatctta 360
atgattttcc tatttgcgtg aaaaatatta agtatctatc atgcatacct aaaagcaaca 420
tgaggattatt taaccctaag tggaaaagga agcaggacca tgtcaaaaga cctatcacat 480
tccttttgat attgagcaag cca 503

<210> 397

<211> 490

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 397
gggagacttt cacgtgggcg tggtttgtac totgaccac tggtgacttt aaacaatttg 60
tcatcaaata ccacagttgg ctttgcagct atctggtatt tgtgcctgga gtaggtttgt 120
ttgttttgtt ttaaattgctt ctaaattaca attctttgtg agcttcctgt ttcctactta 180
cagctgaaat atgtgatgac tgactctacc aggactgctt ttttcccctt ttctgcattt 240
gtgctggaaa cagaacagct tgcacgcaca gcctggagca tgttgctgc atgtgcttct 300
tgggtggacgt gagcannnnn nnnnnnnnnn ncaaaaaccg cctatttata tcctcttcag 360
aagcgctgtc agacattaag cactctctct actaacgtca cgtcgattaa tatggatttt 420
aaaatggaag taaattattt ttactcatg ggtgagtcac tagatagttt tttttaata 480
tacatcccac 490

<210> 398

<211> 428

<212> DNA

<213> Homo sapiens

<400> 398
ggggaggagg gtccctgaat taatgaagg tggtttactc taagggactt tgcttacaca 60
attcgcttca ctttggaatt cactttgagc tgggtatacgt ggtgtaccgg tattgtcgta 120
ccggtattgt accaaaggga ctttaccgac tgcttgattg gcttctgtat atggggctag 180
gtcagagtta acctttttac tgcgcgccta gaccatctc aaaaacaaac aaaaacgtta 240
acgttcagtt ccttaaatac agagccggag aggggtcatc cctaggactg agattcaagg 300
ctgagaggat taaggcgggg gccggaggta atctgaggca aggagcggag cccggggagg 360
agggtccctg aattaatgaa ggtgggttta ctctaaggga ctttgcttac acaattcgct 420
tcactttg 428

<210> 399

<211> 470

<212> DNA

<213> Homo sapiens

<400> 399

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gggccggatg caaagagaag aaagagaagg tagctggaag tgcagagggt ggtgagatgc      60
tgttttat tttt aatgagggga ttttgagttt taggcatgag gtagagaaag atgcgcttag    120
agaattagca aggaaataag atgggtagtt agagaatgta aatggcctgg aagagagtag      180
tgagtgaacc aagtcaa atg gagttgggag cggaggaaga cacttggagg ctgaagggaat     240
aacatgtgca aatacttcag agcaataagg aattatagtc acaaaaactga aagaagtaca      300
ttataggtag aatttagagg tctaaggaga gaatagggaa aggagataaa aagtagaaaa      360
agatgaaact cggctgtgat gggtttttcc ttaatttttc ttttttaaca agtgacatca      420
gatttacaat tctaccagca tcacttgggtg attgattgga tgatggagtg                470

```

<210> 400

<211> 556

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 400

```

gggcaagggc agtccctagg caccactgtg tctcgtccca aagggcatct caagagagtt      60
ttgcagagtt tcatgtaaat gatcattaca ctactaataa atatggtttag tgacttcac      120
agaaagagga tgagccacat caggtgcctt gggccaagga gctggcgga agaactgcta      180
tatttcctta actgaaggca ctgacaacag ccagcagaat taatccatca actgctctct      240
ctcctcctcc tttcttcccc acttctnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn      300
nnnnngctgg cgagggccca ggaccagagc accaagccct ccaatgccca tgtgcaggaa      360
gggcagggtc aagctgctcg gcttcctgtt gaagtccgcc tcaggcattc ccactaactg      420
atcaggatac actcacagtt caccgcgaag agcagacaac aaatgaggag agatagggca      480
acggcacctc tcatgctgcc ttttttgtct gcagcatttt taaaaatata atttacatga      540
tacctactct ttcaaa                                                        556

```

<210> 401

<211> 496

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 401

```
acagcattag gttgtttgtt gcttttattt ctctactttg tttttctgta cagtgcagta      60
tgagtcattg catttctcgt gggagaaaag tcactgtatt catcactttt nnnnnnnnnn     120
nnnnncaata ataaaagaaa cattcaagga aaggaaagtt tggacgactt ttgtcatgca     180
gccaatgaga attgacaaat agggatgatgc ggaattaaaa cttacgtcta aaagaactat     240
taatattctt agctcctcca agtcctatta actaggaaaa tctggattta gaaaagaaaa     300
aatagaatt taatgtaaac aagtactgaa tgtatgaagt cttttccaaa cataatagtc     360
ccacaaattg agtagtatta gatgaattat tagttgcagg atatgtaggg gaaatagggtg     420
aactagctta aatgggagtc tgaagtagaa agtgataaga ttagtagagt cagtttttta     480
tgaatgttct tagaag                                         496
```

<210> 402

<211> 497

<212> DNA

<213> Homo sapiens

<400> 402

```
gggaaggga ggattctgga gaaaggaacc aagagaatct agaattctaa aggaccacca      60
ggggctccag gcctggcagg agcaactaac aggatgaccc accttcccca acttacacca     120
```


cctcaggcgc tgggcagatg ctctgtgact ttatcagtat ccctggggag tgggtgccagc 180
cccaggtgct gagctggagg ggggatcaca gaggaatcaa gggactcaag gagggaaggc 240
agctggaggg aaggggcttg ggcagaacga aagaggaagg ggcttggccc tgggctctca 300
tccactcctg aagcccatgc ttggaacagt gaatgatgca gtgcctgtgt cccaagggtcc 360
cagcctcgtg tgggaccatc ggggcactag cagccttcct gtctcctacc ccttgctctg 420
ggggccaaaa ctggtcctgg aaatatctgt tctttaaaat gtcataaac tctcagtaac 480
ctatctgctt tcttctg 497

<210> 403

<211> 596

<212> DNA

<213> Homo sapiens

<400> 403

gggtatccgc agggacagat acactctgtg tctccttaaa acaagtgcaa ttgaatgtcc 60
attggcctaa agggcttaga gccttcatag cagggccttc ctcaagtgtat tcaattcggg 120
ttaattttgc tgtctgattt gcaaggattg gtgttgtcat cttttacctt ggctttgtcc 180
aagttccagg gtttcttaga aatgccgttg acgaattcac gggcagagcc agaatgtctg 240
tctttaggca ttcttgtctg cacagaaaaa taggtaggtt aaacatgcaa ctttttatct 300
aatgtgggtt tgttcttggt aatggttcct ttattttgac agttcagaaa tgtccagaaa 360
tgacaaagaa ccgttttttg tgaagttttt aaagtcttca gacaattcca aatgtttttt 420
taaagctctc gaggtaagag ttgaaaacat ctttaataccg tgaattcatt ttcttgtttt 480
taagtgtttt tgatttggtg ggctttatgt cttagaagta gatatttcac tttcataata 540
attttatagt ctacattaat acagatatat cattatcaca tatttttgaa ttgatc 596

<210> 404

<211> 568

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 404
gggaggcagg ggcgcgcgag ggtgggttcgc acacgtggac tcaggcggcc accgccgcgc 60
tggctggtaa gaagccccac aggatctccc aaggagccct gggacagtgt ctcagaacat 120
ccacctgggg caagaatggg gactgctgtc cccagggggc aggtggagcc tagtgggcat 180
tcatgacca ggttttggag ctgtgcttgc gagagtggct cccatgggtg tcccaggga 240
gcttggagcc aacgtcccta ggcattggct gggggtttgt gggaaggcct gaggcaaggc 300
ctgtnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnagcaca 360
agagggtgaa ttctgagcag caccagaggg tttccctgac acagcagggg atgctttgag 420
gcccctttaa tgaaggagaa aaatgaggct tagagaaagt cagtgccac cccaagtctc 480
atgggcccga ggctgtgggc agtggctaaa gacaggctag tgggtaactc ggggccacgt 540
ggaaggggag cttgtattta tagcccc 568

<210> 405

<211> 474

<212> DNA

<213> Homo sapiens

<400> 405
ggggctgtcc tgtgagaaac acatgctaca ggcccaacaa caggaagagg ataaagggat 60
agtggcctca ctggagtcac caggacagcc ccgtggtaaa tgatgtgata gaaaaattct 120
cccatctac ttgtgctgag cctttccttt cttggagttg tagtttctct tttgctgaga 180
cacctgttgt cctcaagttc ttctccaggc ctctctcaaa attccatttc aaatacctaa 240
ggctaagtgt aaatattcaa atgaaactgt caaaatttac taagagatat aaataaaacc 300
ttgcgatagt gagacatact ttcttttctg aggtggaagt cttactagtt tttaaatttt 360
tgttcgtccc aaattaatat agatataata tacaatctta tcaaattccc aataggatct 420
tctggaggaa gagaagaaat atttaaagtt cacataaaag atttagggtc cttc 474

<210> 406

<211> 522

<212> DNA

<213> Homo sapiens

<400> 406

```

gggaaaaaaa tgggtgtgctt tagggaaagg ggtttggagt ataattttct gaaacgtaaa    60
gttattttca taaaaaagaa atctttcaaa aacttacttt ttgcattaaa gccataatta    120
tgaaaacaaa ctacacatag tacatgatat gaattaagta ttgataaaca gacttacttc    180
ttctctaaac tgaagaggaa tcattttcaaa cttcttaaaa atttcaatcc tagaaatttc    240
ttaagttttg gataaaaaca gttccacttt catctttctt tttttgtaa tcattgttca    300
cctggatatt catgtaattt ttaaaaatac ttaaataacc acctttagct agagtcacag    360
aacaaaaaaa aaagagagaa aaccccacaa atttaaatac tcagcttctg ttaattattc    420
atgatcaacc acagtcttca ttaatacata tatgtactga cattttaaac ctatttgaat    480
tgcatatgat actttaaaga ttcacaagaa tttgccctca aa                        522

```

<210> 407

<211> 501

<212> DNA

<213> Homo sapiens

<400> 407

```

agcattaagg gcagtccaga gtactgtgtc agcacataga agggacatct gccccacatg    60
tggggctttc aagaaaggag tcttgaagga agtcttatct aacgtgtgag tcctggaagg    120
ctaggaagag agaaccaagc acagaggggc caggggggaaa tagttccagt attgctaaca    180
ccgcatgcaa aacctcaggg ctaaattcat catatcatat ccaaaggaga ccaacaaaca    240
ccaagtatta cagttacaca ttttcatgta acaggtaatc ccaaattta gtgacttaaa    300
atgtactaca caccagcaga tcagtagcaa taactactca gcacctggta cgatgcttat    360
tcgatgcaca ttcaacttca gcgaaataag tcactttcag ggaaaaagta gagcctttcc    420
tctttgaccc tctgccagta caaaagctta tgggggcagg gaataaaca tcaaataaaa    480
aattctagca aaatatgaca a                        501

```

<210> 408

<211> 558

<212> DNA

<213> Homo sapiens

<400> 408

```
gggggatttg cgatgcagct caogatagga gtcttcaaac acatggtcac gacggacatg      60
cacagccatg tcttctttcc ggagccctca tctatgcaca tctcctcaag cctgccccct      120
gacacacaga agttccttcg ctttgcagag actcacgcga ctgtgttaaa ccagatccta      180
cggcagtcca ccaccgctct tgccatatgg cccttttgat gtcttggtag actacattag      240
cagtctcga ctttgatgtc aagcgcaaat atttccgcca agagctggac cgtttacatg      300
aggggctccg gaaagaagac ttggtcgcgc acgacgcgcg aaacactatg ccaatcgaca      360
ctacacgcga gacccacagc aacccccggg ctctgcatcg ccgcttcgcc ttgcgccgcc      420
cactcccctt catgcgacaa tggcagcate tacaaccctg aagtgcctga tatcacagag      480
gaaactctgc attctcgctt cctggagggt gtccgcaatg ttgccagtgt ctgtctgcag      540
attggctacc caactgtt                                     558
```

<210> 409

<211> 534

<212> DNA

<213> Homo sapiens

<400> 409

```
gggggtctctc ccagaacccc cttegatcct gagcaccccc tcatccccct ctgagggtggc      60
gcctctggag ggcaagtgtt ggggcaccca gaaacctcac tgtggagtct gccgttcaga      120
gtgaagccca gcccgacctc tctgcgtcct acctatgtgc tgtgcctttg ggcaaggggc      180
ttccctttcc ctgtctacag agcggcaatc ataatagagc ctctgtctca gagtgcgcag      240
gaccactggg atatcctgag taatacctgg cccctcccag cctcccttcc tttccctgaa      300
aaaacaggtc cttgttgccc tgtgtgagtg gactctcagc aagtggaaac ctcttcctca      360
gcgtgacgtg gaagtccttc ctgtacagca tcttgcaagg aatatccctc tagagtgaca      420
gcttggtatc tctgcaaatg cttcaagcct caggatcccc acatttcctc tgggtgcccc      480
gctgagtggc tcaggcaagg agcatgctgt acgctacgtg acaccagggc ctgg          534
```

<210> 410

<211> 441

<212> DNA

<213> Homo sapiens

<400> 410

```
ggggaatcaa atcatggcca ctgttgacac tcttgacatt aatcccatac ttaattatgc      60
ccaattttat gcatctaagt agccaaaaaa gaaagtttct aataaacatc tgattaacgg      120
taagacagtg atataaagcg tagtgcaaat aaccctggat taggggtgggt gatcagcaag      180
agcttttctgc tctgaatttc aggacaagta acacaacctc agcatgttct cctttactgt      240
aaaagggata cgtgttatca cccacgtaag actgaaggaa tgtaaactat taaaccagta      300
ttagagttct taaatgggtc aagtcataat cattcaagtg ttcaattttt ttttaacacc      360
aactgcacat aacaaacttc tgaatgtcca aaacttctg aaacatttac gtcatttttc      420
gttcattaata agggcagggt a                                     441
```

<210> 411

<211> 473

<212> DNA

<213> Homo sapiens

<400> 411

```
gggacaggct ggttcagcat tcccagcagc acagaatagt tgctcagtgg tgctggattc      60
cctgccatct tgccatttcc acagtctcat ggggggtgtg tgatttctga ccgctgctgg      120
gacctgtggg atgagcacag gcaggagagc cagccaggcc acttctcaga atgaaactcc      180
aggctttgta gagcttctgc tctgctcagg caggacaaac ttgcatcttg ggcatttgtg      240
gtccacctga taggtcacat gtacagtgtt ctcttgccc attgttgaga tagccgtgtg      300
accaggttc ttagaaacca ccagtgtcac ggccatagcaa tgggtccagc ctgctcatag      360
gagaatccct acatatacag gtgggaaatg aggtccttg gagaatagta ctactttatt      420
gggtttaact agaggaaggc cactaagaat tagtatctgg tgtggattaa tac          473
```

<210> 412

<211> 485

<212> DNA

<213> Homo sapiens

<400> 412

```

ggggagagga ggaggggacg gttcaatccc agctcaacac agcacgggag cctcagggaa      60
ggctcctcca cccaccctgt tgctggaaac ctgagcagcc atcctgaatt ttctctttcc      120
cctgcactca tccccaaatc catcagtagg tcccactgat gacacttcca aacaccctcc      180
cccgctgcca ccaccagat gcaggcctgt catctctcac ctggactgtt ggggtggcctc      240
ccgctgccct gcctgcctct ctccagctgt tctccacaga caacagccag agtcgctttc      300
aaaacgcaag cacgacccca gcctccccac cgctgaaact cttcagtggg ttccaatgca      360
ctgagaatca aattctaact actcatgatg gcatgctcaa aaaggcgcat gatggacgtt      420
cagttcagta attaagtgga gaaatcaact gaattggaaa aaaagataat gacttttaac      480
gaaaaa                                         485

```

<210> 413

<211> 632

<212> DNA

<213> Homo sapiens

<400> 413

```

gggctgacct ttccaaaaga cattactaaa tataaaagga gaacaaaaga aagctaaaga      60
tagggcgtgc aaagaataaa aacagcctgg ctacaaaaga acaagttact ggtttggttc      120
caaagctttc ggaccctgcc ctgttattcc ccttcagga gataaccacc tccaaggcca      180
gcagacttct gcaggccctt tcgccaggct ctctggcctc ctagtgctgg cttgtccact      240
gtctagggtg tcttgtagga cccatgccac caggaatcct ctccagacta cttgaccacc      300
ctgcagtcag atctctgttc tgccctcttc tctaccagg gctcttggct gtggtggcgg      360
agggagggat gcctgtttcc ctaggtctcc caggtgattg gcacctatgt gactggacct      420
tttaggagtg cagccttggt ccatgtaggc cttgtaatat gacctacctc ttgccatgct      480
gctcaggcca gtttagccca cgaactgcc aacaaaaggc tttctccaac atttgatctt      540
ggcagaaact atagaagtct cccacctgg ttccatctc cactggggcc acaagaatag      600
aaactgataa gaagttggcc tagttgatgg aa                                         632

```

<210> 414

<211> 755

<212> DNA

<213> Homo sapiens

<400> 414

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ggggggaatg agaatacagg gttgctgcca tatgttattt acaatgccca attttcaaga      60
acagtaacaa aatatgagcc actcaaaggc agaggacact gtgacacatc cactggaaaa      120
tggatgagca ctagggagcc agatgttttt atttagcaaa tcatttgcta taaatacgtt      180
caaagcatca aagaaagcca tgtctaataga agcaaaggaa agcatggcga taattattta      240
tcaaagagac tatcaattca gacaaaaatt attttaaaaa tcaagcggga attttaagt      300
ttaaatgtat aatagctgaa gtgaaattgt tactaaaggg actcgagaac agatttgagc      360
tggcaaaata agcaaacttg aatatagaca aaaattatgc aacctgcaga aaagaaagaa      420
aaagaaataa aaaacaaaca acgcctcaaa gacttgtaga acaccgtaaa gcatgagaaa      480
cttttaccaa catatctaag aacctaaca aattcagtag aacaaacaga aagggattca      540
tactgagatg tattataatc aaaccatcga aagccaaaga caaagaaata atctgaacga      600
gcaaggataa atcaaaagat tttcactgca tacagaggaa cctcaaatat caatagctga      660
ttttttacca aaagccaggg ggtggaagac agatcagata acatattcaa agggttaaaa      720
cgatagcagc aaacactcct gtcaaccaaa aattc                                755

```

<210> 415

<211> 434

<212> DNA

<213> Homo sapiens

<400> 415

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gggttctctt tctgtgatgc aaggatacat cgctgcacta ggctctctga gaaatttggtg      60
actggctagc aattagagtt gagaatgtaa actggccaca gattgaggaa ttccaggcta      120
gagactgtga gccctagtga agaaatgtag ggtcagggct caggaggctg ggattaagcc      180
cactgctgac agaattgatg ctgagacctt cagcacatca cattatcttt gtttcctctt      240
tcagatccag agattcatga gcttttataa gtggaaaaga tttagatgtt ctaacatttc      300
ctccaaatgg gagattgcaa ctttccaaaa tccttggtgg atggttctcc agatttatct      360

```


caacagttct agtgctggaa ctttttagctg ccatactggt gaacttttagt gggccacatt 420
 tacatagcct gtgt 434

<210> 416

<211> 454

<212> DNA

<213> Homo sapiens

<400> 416

gggaaaccat gcgtgacagg gtagatttgt gcagcatcac aactgaaaa cacaggtgtt 60
 ctttgatcca gcagctcctt ccgagagcaa acacacacat ctggtaatgt gcactctagc 120
 acgggctgcc acggcaaaaa tctggaaact gcctgacgac tgctccgcag ggtttgggcc 180
 aatcagtcac agcagattca caggaagctc acaatgcaac ccttttaaaa gtgacttatt 240
 tgcatgtgct gacctagaaa tatgtctact atacatgggt aggtagaaaa attaaaaggt 300
 acagtgtca aagaatatgc ccctagtttt atgaccagaa aaaagtatac actacctatt 360
 tatgcatgta tctaggttat tctgaagaca gcctaaattt cattgcattt aagatttgct 420
 aaaggtttac ttttttcac agttcaaaat tcaa 454

<210> 417

<211> 499

<212> DNA

<213> Homo sapiens

<400> 417

ggggacgaag aggtatgtgg ctcatagggc tgtgcctggg tctcccgagc atgggtggctc 60
 tgcctgaag tgctgtgtt ccttgtgacc cgtgtggctc tgggatcaag atcgtgtcgc 120
 tccggcagcc cctgaggggc cttctccaga ctctgctatt aaaatgctct ttaaggcagg 180
 gagggacagc aggtaggaag gagttctggg ctgggattaa gagggtcccct tgaggaccag 240
 ggacctgttg tcctctgaaa cagaactgca gggcttcctg gacagtgggt agaaggaagg 300
 ctgagcccag cccacagcc tccccgagg gtggagatgt atcatgggat aaatggcagc 360
 cttttgggat cccgctgtgg acagggcgca gttggtgtgc gccactcccc actcacactc 420
 tcttcctgtg tgaacagaaa gactccagct cgtcgcaggt ctgggaggga cccgaggacg 480
 cagggcatac cggaccctg 499

<210> 418

<211> 579

<212> DNA

<213> Homo sapiens

<400> 418

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ggggaaaata tttatagatt gttatactga cctcatccct gggcacatta ttttacgtat      60
caaaatgaat tggggaacga ggccttcagg ggtcaaaaaa aatccttaaa atgagttaaa      120
cgacatgcac aaataatttt caaattatTT atgagttata atcaaatata gacacttact      180
ctgccattaa attccggact ttattggcaa aaaggacagg atcatttttt tcttcatcat      240
ttggtacctg aactggcata aactgaaaga caaatatacc tttccataac aatgtcttaa      300
gcctaagaca ttaaatacca agtaaattaa tttatacatt atcaatatat tgaatcatct      360
acctttctag aacatagggtt atatgaggta atggggcact gggcttgtac tcaggagatc      420
tgttttctaag ccctgagtct gcttgtgtgt taactagtat gtcatttaac tttgatgaac      480
catttcaact ctaaaaagag ggctaagatc actacttccc tgggtgattgt gagggtgaaa      540
caagtcagtg tctggaattc tggaagtgtg aagctgtag                               579
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<210> 419

<211> 674

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously
y

<400> 419

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aaacggtgtc atggagctaa gaaagaagtt tactgaagag tagtcaaaag tatcaaatat      60
```

```

tcccaaagga ctgtttaagc taagaacaga aaagcagaaa aaaaaaggta taattcttgc 120
tttttgggcg cctatacagt catcattact gttaacattt tgggtgtattt tcttctagcc 180
tttacatatt atgcatgata tgtttttatt attctttttac ttattctcta ttttgcaagc 240
tttctttcat gcaattactt ttttataata aactttttct aaaagtaaaa ataaatacca 300
nnnnnnnnnn nnnnnnnnnn nnnnaaccag aaaagtattt gttagtgtgt gcttttagga 360
agaccaggat gaccttggcc gtggtggaag aagtcagact atgaagacag gtgagaaaaa 420
gaacaaggaa atggagacag ctcttaatag aagccagaag gaaaaacatc caggagaaat 480
ggagtgaag gattttataa gatggttgaa acttaattac atgctgggag ccaagaatca 540
atagagaagg aaagggtgaa tataatgaga tggtttgaag caataacatc tctgaggaaa 600
tgaggaggag cagcactctg cctgattgtc ctgtgataga acagactgga ctctctaca 660
gcctctctat ctat 674

```

<210> 420

<211> 440

<212> DNA

<213> Homo sapiens

<400> 420

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gggtggaagt ctcttattct agtttacaaa ttatacagcc tctgactccg ggctaggaaa 60
gaacgtctgg tttctgaata cataatatgc cgtattttgt tctttggagc ttatctgtac 120
tacagggtgtg ctactgtgtc catctagtcc cattatttaa aatgcaaatt tgttattcta 180
aatttagacc aagagattat ctccattagg aaaaaaatca ccgcatattc gttctttaaa 240
ttttcaaaca ttatttaaga ctgttgtaac ataataatat aaataaaacc ttttttcatt 300
actaatctgg aggctcatta cgtacggata aatgttcatt gttgtgtcca gcttttcctg 360
atgatacccc ttgaactctt acattaatat gcttatacac taaagtcaac atctatttta 420
aatagaact gaaaaagatg 440

```

<210> 421

<211> 431

<212> DNA

<213> Homo sapiens

<400> 421
 gggggaggga gttacaagtg attccttaaa aactttaacc aattatttct catttttatt 60
 tggtgctggt gttataccaa taattaggag aaaaataaaa atagaaacta taaaaagaga 120
 aagatatgag actagaattc aatttctaac acaaatgaca tttagctggt acgtatgcaa 180
 gatcatactg ccctccttat ctttaaaatg tggatatagga gaaaacatag aagtttagatg 240
 tctagaacaa cagcatcatt accgttagaa atatcatgga actccccccc acacacacaa 300
 acacaaaaag ccattgcaaa gaatgcta atgctcacagt tacagcaaag gcatcaccaa 360
 ttgctgaatt ctggttttta gtataatgca gcctctcgct ctgatcagaa ccagaaatgg 420
 aagccaggca a 431

<210> 422

<211> 406

<212> DNA

<213> Homo sapiens

<400> 422
 gggtagtgac tgcaccgtcc ccctggggca tgtgtggtgt attaaaaggc cgaagaggtc 60
 tcctctgggg gagatcatga gacggatata ggatccagac tggttttttt tttaatggtt 120
 ctagggtaca aaaaaaatg gtagaaaaaa aagttttacg ttgcagacag tgagtaagag 180
 tgactcaatt agacattctc tgcttctctc tcagaagaga ggggcagcag gagtgaggct 240
 ttatggggaa ataacctggg ttccacgca acccataagc agctcgtggg actctgagca 300
 accactaac ttctctaaga ttattttgag ttccaaaatg agtgtttagt catgagcttt 360
 taaaccttct gcttcaagga aagtacttac aaaggactga agtttc 406

<210> 423

<211> 486

<212> DNA

<213> Homo sapiens

<400> 423
 gggaaggaaa ataaagagat agaggtgaaa gtacatcttt gctctggttg gtcaagcatc 60
 ttctgaatc acctgtcgct cctaataaac tgcaacaaca gcaccgctga gcgtgaaaca 120
 ctgtggatag acagagaagc tgaagctttt atactctata ccaaataaat gtgatgcaga 180

gtacaaaggg aaacagcagc taagcagaca ggtcagagaa atccaatttg atgtgtaagt 240
aaaaaaagaa ctggcagggt ctggaaaaat ctagcttttt aggaagaaat ggaatctgag 300
gaggggcatc ataaaagact aaggattcac ctcccttctc cctcttcaat atcatactat 360
caatcttttt tgtaaattgg agaaattcca caagctcctt tccctcatc agtttcatgt 420
actctctagt atatatagaa tccattatgc ttattcctat ctttctatct ataattctgt 480
gcatgt 486

<210> 424

<211> 466

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously
Y

<400> 424

ggggtttgcc tgaatttcaa atttaactgg ttatcctgca ttttatctgt caaccctaca 60
cacaaatcct taaggctctg agttttcatg tggagagttt tctcattcag tgnnnnnnnn 120
nnnnnnnnnn nnnnnnnnna cacataagcc tttagaaaac ttgcttaacc tgcagctaat 180
aattcatatc gtagagttgt catgaggatt aaatggagaa aatgcaaata aatctagggt 240
caggtagga ttcagcagct gctcgaaaat cattaggtaa atgtttattt tcttttttcc 300
tctcaaactt atttcaatgc tttcctaacc tttccaggaa gaataaggag ctccctcctt 360
ttccctttca acaggctgta cttctttctg ttgcagcaac ctacatgggt taaggcttgt 420
tttgtaataa tgacatagac ataccaattt ctttcttggt tggggt 466

<210> 425

<211> 462

<212> DNA

<213> Homo sapiens

<400> 425

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ggggagcagg ccttgtcctg ccagggtgctg acagagacca caggctgagt ccaggtttcc      60
ctagaaggga accatggact agagacaggg cagtttgagc atcaataaca acaatgacca      120
tgagggtcag aaacaaccaa caagaaatgc ccagcaggtg ctgctcccag tgcggccaaa      180
tactcagcag gtgctgctct cagtgttgct gggtaaggat tcgcctctgc aggagagagg      240
taggtggggc ccagcccagc accacgtgga aatcccaggc agggtgcaag accactcacc      300
agcatgcctt ggaggggaag gagggcccgg atccggaagt ggctgggtccc tgcaactcct      360
ttgcttgtgt acagcaacat atctgagaac agaaaaaaca tcctctgctg caagcccttc      420
ttggtgagct tgtgaaggca gccctcacgg atgaactccc tg                          462

```

<210> 426

<211> 532

<212> DNA

<213> Homo sapiens

<400> 426

```

ggggaagaca tggacctttt gttactgata aaattataac ctattactat ttttggttat      60
tgttttaaca taacattatt ctttgaattg atctcaaaga gaggaaaatg agaggtcact      120
gaaatgaccc tggcagtaaa atttgctgaa aagcagcgtc ctttacaagt ccttacctcc      180
gaccgcaaaa gagtcttcta aagaccactc tcagccctca agggtccttg caagtcagtg      240
acaccacagg aaatgggaac cttgccaaga attagggaaa ttcaggtgtc tgcaagtccc      300
taaaccctag ggccaaaaaa aggatttggc agatgtttgt gtgtcctgga ggcagatgga      360
tgaaagtatc agtaggctcc gtggcttaag tgctagtcag tgctcgccat tggctcttttg      420
cagtcttgtc acttctgtct ggaggcattc aaagagctga aaggtaacaca gtgcagtggg      480
aacatctgga attgaccctt ggctccacca tcttcatgat tagtaaagtc ac              532

```

<210> 427

<211> 666

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously
y

<400> 427

gggaacaggg cctggatgga gaatgtatac tccatcagca ctaactctgc tagactctct	60
tattaatctg ccctctgaag gcatttgggc ttgtggccct tgagttagtt ccatggcctt	120
ttcaagaaag atcctgcagt tccaatgtga gcagcagttg tttccaaggc taacaatttc	180
acgccaacta gaagcctcca caagtcaggt gccaggcatt tctaagccag tagagcagct	240
ccgcttggtt ctctgggtga gtcctctcag ggtgagaccc tgtctccttg taagcacnnn	300
nnnnnnnnnn nnnnnnnnnn agacgggagc caatcaaagg caaactgcgt tagacagctc	360
ttccatgcgg tatggacacc aacattcgat catccttggt tcagagaagg tgccggggccc	420
cagacatgtg cttatcactg ggtcccatgg ccttcaatcc tttaaagggg ttttaagggtg	480
ctgattttta tcccagacat tgatcatggt ttttttcatg cagaatttgg gcagttgtct	540
ggacattagg agttgagtca cctcctacce atgaggaaca agcctgtggg gggactgata	600
ttatcacttc tgtcatcaag aaataaggcc gcaggcatcc ctgaatatag agcatttatt	660
aatcga	666

<210> 428

<211> 558

<212> DNA

<213> Homo sapiens

<400> 428

gggtgggatt ctggggaacg tcggcatgta aggcacagtt agaaggatga agaagaaggc	60
aggagaggta agaaaccaag agggtagcgt gtaagaacca aggaaatagt ctttgaagaa	120
aaaaggaacg gccggcaatg gtagtgctga gagatcaatc aaaattagag ttgacaagtg	180
cctgttggat ttttcggtaa agaggaggat gtaggcaacc ttgtgggaga gtggtgtctg	240

gagtggggag gccacttcca aagagcaggg cagatctggg ttcactgggg caaggaaagc 300
ctcctttccc tgagcagcac tcacagatcc aaagcctcac atgataggat gttgcttccc 360
acagggcccc ttccctatatt gcaaaatgga acctggctct tggcttgtgc ttccagccat 420
ggtgtttggg agtgcttgcc agaaaactga tattgcagat aaatcctgta gctcctcact 480
ccaacctatt ttcattctct gggcctgata atgtgtttgg atggaaggca tctcctgatt 540
ctgaagtgat cttaattc 558

<210> 429

<211> 517

<212> DNA

<213> Homo sapiens

<400> 429

atcacttgaa taatatttaa acctatcgac taggccaccc cactggatca gcagcggaat 60
tttgaaataa tattcaaata aggtttgggt ttccaagtta cactatTTTT taaaactctc 120
acactctgca tcttcataaa ctatgatcac agtttattaa atcaacacaa tgaagtctac 180
acaccttccc actctagttc aaaataaagt ttatcttata actaagaata cctatagcaa 240
aaatgattaa acacgaaatt agataaacat tacataagca aattgaaatc agttttcata 300
ctaagtctac cttagattca ttcacagctc tctaaagaac agaggatctc aagggacctg 360
tgagagagacc tatctgacct cctcagttta cagctgggaa ccaagcaact gggcttagac 420
tgagcccagc gacagctttc aaatgatgct ctatTTTact tggaactgac tcttcccaac 480
catcactgcg atccctaggt aatgcatttt atttcct 517

<210> 430

<211> 538

<212> DNA

<213> Homo sapiens

<400> 430

tttgtttttt gaggttttgt ttttttgtgt gtgtgtggga aaaacagaaa tctgagggaa 60
aagaacacag ttaaaaattg ctgtaaatgc tggagtaact cccagggagt taactgttct 120
gaaacaacca cttataactaa ctccggatta acaaagcta ttttgttcaa atcctctttg 180
aaaatcctcc agaagtatca cagttctgcc caaagataag aaagtgtgta acacgtcgct 240

tgtttttacac ctggtagctc atggctcctc catgatttaa aacgtcgggt ttgagtttgg 300
 tcagtgggtg tcc tagctgt gtgcgctgat taaaggtagc cacgaaacgc tggggaaaaa 360
 agaaaaaaaa aaaaaacaag agaccaaact ttcttgtgat gtttatattt ctgcctgaat 420
 ttgtaaatgt taattgtaag ttattttgtt tgacttttaa tcctcctcca agttctttta 480
 aaatatgaca tgcttaacat gagcagctgc ctctgtgcct tttctgtcgc ctgggagt 538

<210> 431

<211> 619

<212> DNA

<213> Homo sapiens

<400> 431

catctatagg gttgagttct gtgtcataca aataactaaa atgtattaaa tgagggaatg 60
 aacagctata aaaattgctg aaaatcagct aaagacaaca atctcaatgg atccactgga 120
 ctagtgcata aagacaatat aaataaatta gtaaattaag cctgaaaaga aatagtaatc 180
 ttgccagaga gaaacataaa cagatatata tgaagaagag aaaaaatggc atacaagatt 240
 atgactccta gagataatcc ttatcataac tgtgggtgct attattttgt ggctaaacaa 300
 gacagaaaaa cattaataag agaagttttg cttcaacttt ggtcaaaaat attagggttt 360
 aaaatttacc tactgctttc ctttcacagt caggcttttc caaattttta ttctgaggca 420
 taattattta aggcctcata ctttttctat aactacattc agtattcaca gaaaaaactg 480
 agcatgcata ggaaacaaaa agactaaaag gctagaatgt caacagtgat actccatggt 540
 tgacgggttt caaaacaatt ttacatttt cctatatattt ctgaattact taaaatgagc 600
 cataatgttg ataatacagc 619

<210> 432

<211> 456

<212> DNA

<213> Homo sapiens

<400> 432

ggggaaatta cagggtggaa ctcggtcaag aaaaaaaaaag acatatatgg aaaaatgtaa 60
 actttgagct ccatccctga agaactctgg aaagtctgat ggagttatat actcaaagta 120

gcaaatgaga atcataccaa tattcttttta ggcaaaagaa atacatggga aagaatagaa 180
gggaagggaa ataagatggg agaaaggaat caccaacatt aatgctgtac caaacaattt 240
tttaaataca ttctgagtag ttgaatattt gtagttggca ttaggaataa tgtcttatca 300
atatctagaa tactactact agaaatctag ctaactcttc ttttaattag aaaagtaata 360
aggaatggat ctttggtcac ttcagcctct gtacgttata taagacagga caattactgg 420
acttatctta tgacaaaatt atatataaat taggca 456

<210> 433

<211> 694

<212> DNA

<213> Homo sapiens

<400> 433

acttaaatca ttttcttgtc ttccaaacaa aggactataa cgtaacacaa aatgacacat 60
tacactgatt gacagcaaat ttagatagaa aaattaaagt taacatgtag ccttaaaaaa 120
agaattaatg tcttaccctt gaggtcttg gacggtcttg ttttcaactt tttgttcaca 180
ttctttttatc atggaactta aaataacctg attaaaaaaa tttaccttag tgaaatacag 240
tttacatagt aaaatactat ggtttaatct aatgttttaa tttttaatat tcctataagc 300
taatatgtta attaaaaatt tagttttggc agttactttg ttaaaggaat tcatattaga 360
ttgctagact aggttcagaa gtagcttttaaaa aaatctcaa tcatataaca ataatttatt 420
ttgattttca ctagtcttct ttctaaatgt tttctattct cccttagctt actcaccatc 480
ttctaattgtt aaaagtaaaa tttatataca tctatatatt taacatacac acacactatg 540
gtcacacaca tattttccca gtaaaagctg tcctgttcta cgccccttg ctttctccag 600
gttgcaaaaa gcaagatccc ttatttttaat gtctagagct gagactaggt acagcaccat 660
ggctattaaa atataatgag ggatatgctg ggtg 694

<210> 434

<211> 757

<212> DNA

<213> Homo sapiens

<400> 434

aaaaggaag gattataaaa aatagaaaaa aatgagagga atataatttg ggcttaccaa 60

```

tatttctatg aagtacgaca tgatttaaca ttgctgatat taagttcctt gcaacttact    120
atatccacta tagattgtat aaaagtagtt gtataaaagt tgaagggtgag gtccataaat    180
atttagacta tctttttttat ttcttgaatg tactataggt catttatggt ttctttatatt    240
ttaattcttc cagttaccag acattttgca aacatttaca tggcaatatg tacttttcaa    300
agctcggaag acttttccttt tctgattggt ctccctttcta ctgtacatat taaaatttga    360
atttcagaca tatattagac aaatatatac aaagtttagg ccataccagg aagtagacag    420
tttagagggg attaaatatt tgagaaatat gcttatgttt ggtattgtta ttgttttatt    480
tttggtttgg actttttaatt tcctatttct tattagtgtc tcattcaaatt ggattttatt    540
gatgtctcta agatttgatt tccttttctt ttccacacaa ctgtgtgttt gctcattagt    600
aaaagttgaa taatatacag tgtttacatt ttaatatatta attgttggat gaatctcact    660
tcaaggggta aaggctatag ttcatgaca gtgatgaaat aacctagctg gctctcatgt    720
aatagcaac gaatgtgcac aatagttaca ttacatg                                757

```

<210> 435

<211> 421

<212> DNA

<213> Homo sapiens

<400> 435

```

agaaatgaga aaatagtctc ttcccttaga gatcttctct aagttgtgct cattctacat    60
atggcatgat gtacttctgc tctttccctt ccttcaaccc cgcttaccct acagaccat    120
tctgtttgct gttgctttta ctcttaggca tataaggcag ggtccaggag aggccaggtc    180
cagaactttc aactatcctc ctccagtga gttacacaga tagcactaat ttgcccagc    240
aatgacatgt agcaatgtgc atggagtatt gccagccaga gaaacttacc caggctcacc    300
acggtgtaca gtttttttat tggggtcggt catggattta tagctgattg cccacatggc    360
tgactttagt cttttgcccc tccagagggt aagctggtac cttgagggtc agggcaccta    420
t                                                                421

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<210> 436

<211> 421

<212> DNA

<213> Homo sapiens

<400> 436

gggtgtactc aggggcacat ttcacagttc tttgggggct ttctagaaaa acaggccagt 60
ttgtaaggag tattgagcca ctggactggg gtgtggcctc tgtctagaaa aggtcagtgt 120
catctgaggg atgctgcaga aggtggccgt tgccatgtga gtcacgagt ctgtattggg 180
aatggtgtgg aagtggaggc tgaatctgga ttactgaaaa ccgtttctgc attataaatg 240
ttggatttac acatgcagtg gctttcagtt gactctttca cctcagaat tacagtgtta 300
tattcgtttt tgctttttac agtcatcatc aggcaaagaa aataaattac agaattagac 360
atggcttttg caaatgtgtg catttttgtc ccaaaggaaa cagaaaggtc acccttggag 420
a 421

<210> 437

<211> 478

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously
y

<400> 437

gggggtaggg agcaagtcag ccaccaccag aggtatttaa ataccagcta gacaatcact 60
ccacggggac aggttccact ccttgtgaaa ggggtcaaata aaatcttctc ctttggcacc 120
caaaggagat ctagtggagg gcccaacaca ttagatacac aacaagtgtt gctgactgaa 180
tgaactatgt tttcacacag attacaggtc aagcaaaata ctaatgtaac tctaatatat 240
taagggcatc ggggtgaccac tgaggtactt tatgtgggtc caactaagaa ataagttgga 300
aatcaggtc atgaaatgag ttctgatgct cctaagtaaa aggtttgagc cactgtgaga 360
gtcnnnnnnn nnnnnnnncc caaaggctct tcccatgaac cctatgctca agtcaaacag 420

ataaagcatc gctaaaacac acttcagtgc ttttaagatt taggtotaag ccaggtgt 478

<210> 438

<211> 440

<212> DNA

<213> Homo sapiens

<400> 438

tggggaagtg tcttacccaa agtcagtgat ggagtcaata acctttcaaa gcatgcaggg 60
 agggacatag ggaagagaac atgatttggg cttggagcta aagacaggcc ctctgggagg 120
 ctgctccatt cctgcaggcc caagcatcag tctgcatatt aacctcttcc cttgtccccc 180
 tgccccaggg ctgtaccaac tcatgaactg tcttttagctg gctggcctta cttgttggag 240
 ctgtgggtag tgcagtcaat acaatggtag gctgggaccc aagagatccc aaataagcag 300
 gataaaattg ggtggtaaaa aagggaaca aatgaaaaaa accaaagtgc ggaaccttca 360
 aggctcatgc ctggagtctt aagaaggagg atctggataa gtagatggaa gagtctgctt 420
 tcctgaatga cccgcagact 440

<210> 439

<211> 487

<212> DNA

<213> Homo sapiens

<400> 439

ggggtaacag acatgaacta cagtatataa acattttctga gatgaaaata tttaagttta 60
 gagacagaag atctttggct ttagtgtttg gttaatcagt aggttgggta ttctatgaac 120
 tcaggtttta aaagcttcaa taagatgaga tctgtttctg taagggtgtac cagttgatcc 180
 tacaagtgag aacacattca ttactgcac tgaggcagaa cctattgttg aaattatatt 240
 atcttaatat aaatactgcc aggtattggc tggttgattc atcatgcaac aaatggatat 300
 gtaaccaa at ttacacactt gtctaagaga aagtactccc ctcaatacta caacattaaa 360
 tatgcctttc tgtatttttc accatctgag gcactagacc ctagtaatat gtctttatatt 420
 tgtgaggggt caagaaatgt ctagctagta agagaaactc ttagttagc tatggtagt 480
 agcactg 487

<210> 440

<211> 471

<212> DNA

<213> Homo sapiens

<400> 440

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ggtggtggcc gcatagaagg agaagaggca gaactcacac tataaaggcc atcctgaaat    60
tacagaactt tccctttatc ataagggtaa tgggaggcca gtgaaggggac ctcggcctgg    120
taaacagggtg agtgggacat gatcacattt gcattttgaa aaaaaatcac tcaagctgat    180
gagcaaaggg gagactgggg cggaaccagt cagtctctga taaaaacaaa tgtccaatcc    240
tattcgctga attcctggta tatgcaaaaa actagaggag gtccttacia aatgctcaaa    300
gcaattctgc aaatacactt cagaccacag gtggagctgc ggctggagag aggagtgtgc    360
tgaaatcaaa tggtagagac tcgcgacatc ctccaagctg aaccagccg tccacacgat    420
gcaaataaac attttgagtc cccaccttac ccacatgaa atttacagat g              471
```

<210> 441

<211> 400

<212> DNA

<213> Homo sapiens

<400> 441

```
ggggccaaaa aaaatgtatt tcattaggtg ctgggcctac aaagatagag gtgtgattac    60
tgccctctgg gaactcatag ttagaaaatg caggtggata ttgacaagca accggaaaac    120
tgtgtttcct actaggggca tgaggaagga gctatacaaa tagatcaagt aagctaattc    180
tgcctagggc atagaagaaa ggtgccaga gagtttcaca gagaagggga tatttaaata    240
gtcccaaagg taaacacaat ggtaagagga gaacagtcct tctaagcaaa gggaatggca    300
agagtaaagg catggagata taaacacaaa ggcttgtgtg ttaaagggtg aaggagtgag    360
gaggaagcag tatgagatat gagacagaaa atcaccttag                          400
```

<210> 442

<211> 472

<212> DNA

<213> Homo sapiens

<400> 442

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gggacctggg gtctgggctc aggagggcca cggccctcc cactcctgag tgtgtcggga      60
ggctctgccc ccatcgtgct tcacacagga cagtagaagg ctgggcgggt caggccttgt      120
ggagtatggg tgcagagggg gcagtcgcag cacgcaggct gagtcagggc ctggggacct      180
ggggagcagt caaacaggat atggaagggc acctctgtcc tctgttcaca ctggacacca      240
tcacccatca ccagccccgc cggcggatgt cagcacacac acctgcactc agcgccactc      300
cacagccact gtgggggtccg gagcagctgc ccccgcaactt gggccgcgtg gccttgtctc      360
agtctgcctt gtcacctgtc aggtggactc ctggagttcc cccaccccga tgtgtgagtc      420
tctgagggac ccaagccctg aggcactcca ccccagggtg ctgcagacac ct              472
```

<210> 443

<211> 541

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously
y

<400> 443

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agtagggat ctggtgccta agaggtactc agtgaacttt tctttccctg cctaggttta      60
aattagaaaa gaaaaagggtc aaattaggag tcttttagta agcccaagtg aaccatagca      120
tgagaaatag ggtgtaaaag cactgagaaa aatcttgcac tttcctctga aaggcacact      180
attagnnnnn nnnnnnnnnn nnnnnnnact ggaaaaatga cacaagtatt taatagatta      240
gattaaatct gagaaaagta cgtttaatgg catctttgta tcaactgatg ttttattttt      300
catcccaccc caccagttct cttttctgta atattctggg taaccttttc ctgattccgt      360
aaggaaatgt ctgcagagaa taataaatat gagtaaggct atgtagctaa ttataggtta      420
```

cattctctct gactcgtctc agcaaactta caaagaccaa taagaacttg aggagtatta 480
 ttccttgtct gtctttgtcc ttccccttac aattctactt tgactctggt actttcatat 540
 a 541

<210> 444

<211> 522

<212> DNA

<213> Homo sapiens

<400> 444

gggtacatgc tgtgtggaat gtttctgaga gattttaaac tgcaggctcc taactaccca 60
 gtattcttcc tggccactcc tttaaagaatg ctgggcagaa aggaatctca gaactcattg 120
 gctggtgcct ccaaattgggg gtaggcagta ccagccttca aggaagtgtt tggaattgag 180
 tgctggtggt gggggaaggg gttgcttttg gtcattacaa tagtgaataa cctagtgaat 240
 gctactggct tcttaggggc tcaaggtcag ggagtctaaa attcctatga taggagaatt 300
 ctaatggata aggaatagtg tgtcccagac atcagtgaca ttcaagaata tggaatcact 360
 cattttatag ctgagatcca gaaggattat gtgctccagg ggccggtaca gagcacagat 420
 cagctctcct caaatacagc ctcccttcta cgggaactca ttctagtgcc ccacagtggc 480
 ctcttcatat ttgttgtctt gtgttcagag aatcccaagt ca 522

<210> 445

<211> 574

<212> DNA

<213> Homo sapiens

<400> 445

gggtgtcaat gaaggactta aaggacttaa aaatggtcct gttctcagaa ttcagggtag 60
 gccctgttct gagtttcctg agaattctct gggaatgatt tttgagtgat aagtacatca 120
 aatgtatggg tccttttttg ccataggcat cactagacaa ggcttacagg tggaattgct 180
 tgagttctga agttttttgt atgcttaaga agtcagtatc atacagtata aaagtactat 240
 aaaactagga attcacaaca aggtgaaaag ccagaggcag aaaaatgaag acatgggaag 300
 agagaatgaa attacgtgta caataattta caagttatta atattaaaca agggtttggt 360
 atttccttcc agataaaaagg cctaataattt,attacagtga aaaataatca gcaaataagt 420

tgtcatttct ttccacattg attccagaag ctaaattgtca ttttaattgt ataagtgtta 480
 gcttatggaa gttgggactg agtttggttt ccttgaagaa aatttaggaa agaaggggat 540
 aatgattaga aaaatatgtg ggatgccagg tatg 574

<210> 446

<211> 719

<212> DNA

<213> Homo sapiens

<400> 446

gggcagaccc ccgctcctag actttgccat cctgggttatc aacatgcaca aaaggggaaa 60
 cagtagtgaa acttgttgcc tgctgacaaa ccttgatcta catctgtgtt gccattact 120
 tgttcaacaa acctgttact ttttttggaataaata attcaggga agtcattttg 180
 aatccgctga catctgttgc ttgtacaact ctgaattatt catcagtga cataaacagt 240
 attaatataa gaaaagtact gaggcagacc attgaaatag aatgaacat tgcagaagaa 300
 aatgccttta ctgagagcac atttcacatg tcattgacaa atatcacaaa gaacatgcca 360
 gtccttagaa cctaaaggaa ctgtactttt agaaatcaga cggcaggata tcatgataag 420
 ccttattttt atttttccaa ttttattttt ttcttccctt cagaaaaaaa aatcataatc 480
 tttgatttgg tctgtttcaa gcattctacc cgtttgtcct ttgttccaag aagccgtatg 540
 gcattctatg agaaagaaag tcttactaat tgagattcaa aagaatcaca agaataagtg 600
 tcaggaataa gtcacatcaagt gtcatttgt aaactgagat ttagacatat taatggcaga 660
 ctcccgccca aattaaagat agctcaatct agctaagat ttatttccat gacaacctt 719

<210> 447

<211> 566

<212> DNA

<213> Homo sapiens

<400> 447

gggaatttag ggtgttgga ggataggacg tgctgaaaga ggtgctgtgt aggacagga 60
 ccagttcttc cctacccac ctgactcctt tcacaggga gagctagcac taggcagttt 120
 tgaagtagat caattcatct ttgccacaca gccatctact tttctgtact ttcttgacac 180

tctctcttct ccctgagtcc ttcgtagcct cttccagtcc cactgctgct gctgggtaaa	240
taggaggatt accctgggaa aggagaccag gtgcaaaaat gatatttcag gaactaaaac	300
aggctgctg aaaggtctag gctcctgaaa taccacgttt ggggatctac aagtggtttc	360
gtgtaactag aatagaaagt gcttccatgt ttcaatatta cttctctctc ctttttaaaa	420
aaaaatcctc atcaaaaactt tatttcactc aatatagctt ctttcaacta aatgagggga	480
aaaaggtaa tctcactcaa tcggttaata caatacagtc agccctcagt atccgcgaat	540
tccacaacca gccgcagatc aaacat	566

<210> 448

<211> 644

<212> DNA

<213> Homo sapiens

<400> 448

cttcagtaat tacgttagaa aaattctgca gtctaaaacg gcccaaagat aaggggcaga	60
tgggttgga cagtgaaaaa aacaaattac agactgttg taaagataaa tatttttggt	120
ttgtgtaata atcaacaatt tgaagtaagc taactgggtt tcttaattga atgaataaat	180
atatatatcg tataagtagc agctcaatac acatatagaa catactgtta actctaaaaa	240
gctaggctaa tttatattat taaatagggt ttagcaaaca cattttttta agaaaatgcg	300
gagtagtcat cagaccagct caagattatt gacctcatc aaagttgtga gcttagaatt	360
actgcgtatc ccaaatttgt caagtaagag ttaatgagaa tttaactgac ccggttctct	420
acttcataa tccgtgctct gtggtacaga tgtcacttat cttcacaact caccgagagc	480
tctgtttgac agtaactggg gaattgtaat aatacagtaa ccaatatttt gactgcttgg	540
tgaactctca agaagatttt tggatttata cattgctgca ttttaggacc aaacagtttg	600
ttttgcatac ttgaataatg gaaagcaaga tatcagttgt gctg	644

<210> 449

<211> 519

<212> DNA

<213> Homo sapiens

<400> 449

ggggtgcggc gaggcaacag agccgttaaa aagcgtgtgg aattctatgc tgaattcttc	60
---	----

aagttctgac ttcattcatg ggactacttt cttttatata gatagtgatt ccagaaataa 120
tgtcccataa tagtatttca gaggtgctct tgggcacaat agctctagat agtggagatt 180
aggtagatat ttgggggtctt acttcacggg cgtgttatat gagaaccttt gcatcatcca 240
ttttgcttct aatcacgttt tccatttctg gtgtgtgctt ccctcataac cctgttttta 300
tatcataacg tttgctgtat cagcaccat tctctttcca ctgctcagtt ttaaatagct 360
tcattatgaa aaatatagta cttaaaaaca tggcacaat gtgtattact tcagcacaag 420
ataaagagat tactgagaag tgcactgact gctgaagtaa ctttatccta agggatattt 480
cgctacttta attgattttt tctgtccatt ttattaaga 519

<210> 450

<211> 403

<212> DNA

<213> Homo sapiens

<400> 450

tgacacttgg aaatcttaat cacaattatt ctttgttttt ataatgttta ctgttcaaatt 60
caatttctgg ttggatagta tgtatatata aagccatgct caatggccta gatataattta 120
ctgccaaatc ttttatgctt ttagtgtttt ttttctggac aagatctatg cttattgcaa 180
taaattaaat gcaaagaata ttctagtaga aagtcagtct gcacttccta aaccccaccc 240
caccccacca attccttcat aactgttatt aacagtttagc tgtgttttct aatggattat 300
ctccaaagta tatgtaactc agatttttgt gaggtaggaa aagaataaca ttaattccac 360
ttcacatatt gaaagtctaa catacaaaga gattaaatat ctc 403

<210> 451

<211> 709

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously
 y

<400> 451
 ggggtacttt tagaggccac aaaaatatct taatttttca cttttttaaa tttagaaaaa 60
 aaaaatgaat atataacaat gaatccagcc aggattgttt ttgtctttct accagcacaa 120
 ttgnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnngaggaa ggcaaaactg cccagggccc 180
 ccaaaagtca taacgcagcc cagcccacat cctctgcccc ttagaattca cagtcaccct 240
 agctgcgggt gtccccacct ccaggccaca ctctcccct cccaggcgag ggcccaggca 300
 atcagggtgt gaccccgttc tgaccccctc cccttcaggc tctggccagg gcaatcacag 360
 ctactgatg atctcaggat agagtagaac attcactgga acccagaaag gggagagtcg 420
 gtgttagctg aatatcctgg gtaaattggc aaagaaacct cttttgttcc agtcctgggg 480
 ttattcattt acttatgaca ctttacctac tgccacaaag gattcaaagt cacaagaatc 540
 tatgtaataa aatagaaatg tgtgtaaaga gaagtttaaa agtcagagtc aaggaaaaca 600
 agtagagagg agacagctgt ggctgggaag cccaggggat ggggaaggtc cttgccgtaa 660
 ctgaggcagg gtcacacaca tcaactcagg ccacctagt gtcacagaa 709

<210> 452

<211> 482

<212> DNA

<213> Homo sapiens

<400> 452
 atgtgaaaag ttcttatcac tctaatatgt taggggaaaa cccatctcac ccattgtccc 60
 cttttctccc atttccatta tctcccccac atgttttaaaa ttgggctaaa ttaggctgag 120
 tcaatgtttc atttttcctc cttcacaaag gtaggggaca tggctattca ttgggccatg 180
 ttactagtgt gatgttatc aagatgactg ctttaaatac cattttttac tctctggaca 240
 tgtatatacc aaacagactt tgaacttaag ttgcttgtct tgcaggtaga ctaggccagg 300
 gactttctga agaagctatc attctctaga actctacaac agagtgtaac ttagagccct 360
 gttatatttc caatgttagc cacattatcc taaaagctg ctacgcagct ctggtcctag 420
 gaggtgggtg gagaatggcg gaccagatac cctgattggg taatgatcct attacctgat 480

tc

482

<210> 453

<211> 633

<212> DNA

<213> Homo sapiens

<400> 453

atgaggccgg gcctgcaatg atgtgaagcc cctgaggacg cccgaatggg ggcccaaagt 60
ctctctgacg ctcaccatgc cctgactatc atactatctg aacgactttg gctgggactg 120
gagctcttaa attttacaag aaggaaaatc agttctgacc caccaccata caacttcctt 180
gaggcgcgag ggtgtccaca atctccacag aggcggcatt gggtcaccgc tggaggatgc 240
agcaggaggg aggaccctg aggagcgccc cctgtaggac cggaaccctg gagggttcgc 300
ggcaagggtc tccggggcat aggaaacggg catcccccaa gggtagtctg agttccgccc 360
agccccattc ctggatgctc acgccgtctc ccctaaactc ccactgcgct caccgggagc 420
ccatctcatc atcaccacag cccgtggcta atgggccaaa acagaagaag aaaagcaact 480
ggcggagtac aacgcgcctg cgcattatca gactcaggga caggctggaa cctcgccccg 540
taagtaggcc atttaatgac gcgcaaactg ggaaggccta tgactgttga agaggataat 600
cagaagccaa cccctaoggg tccccggtag ctc 633

<210> 454

<211> 576

<212> DNA

<213> Homo sapiens

<400> 454

gggtaatata aatacacagc attggtgtat attactatgc aaattattta tgggtattca 60
atggcacaaa aagcactaca gctgtcatga atatattaat actgaaaaat ttctcaaaca 120
cactctcctt atcaaattta ggtcaaaatg ctaaaagcta agttcatagt ctttatttag 180
gtaataatat cagtattcta tcattaatag tattagttaa ttctcttaag agatgatatc 240
atcattaaga gattgaatat attatatata cttcagccac tgcaagcata aattagaatt 300
caatcaaatt gcccaagtaa tgaatgaaca cggtactaac cgatgtgttt cttctggatc 360
tacgagagta gcgctcactg tcttcctaac aatgaagaaa cagcatgaaa aggttagaga 420

cagatggaca caggaaaagt gctttaaaaa agcttaggta gtcccactgc accataatac 480
agcagttctg atctaaatgt cacataaata ttttctttgc cttcatttaa aggctttaat 540
taaaccagtg ggtaaaaatg tttttttctg ggggtgg 576

<210> 455

<211> 464

<212> DNA

<213> Homo sapiens

<400> 455

gggcagtgtg gagtaccact tttgctctga attcgagaac cctggagccc ggggattagg 60
agaccggagc ctgctttact caaaagctgt gtcatttggt ctttaaagtc acagcctcgt 120
gaggatcatca ccaactgctc ccagtagcat ctgccccaaa tagtactgac atctgggtgt 180
tttaaaaaga agactcattg ctgtagaatt acaaagagca tctaaccatc atcacgcagc 240
acttttggtt ctgtccagct tgaactaaaa ggagagggag gaggccatca atggaaaatg 300
taagtgtctt ctttgaagag ttaatctgct gatttcacgg ctgttccttc tgccatttct 360
catctctcag atacaagcac gaacctagca cacacaagac ggtcacgtag ctgttcattt 420
cacgatggga tcagaagaca agctctcatg ctccaaagcc cctc 464

<210> 456

<211> 458

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously
y

<400> 456

gggogagtgt gtcactcttt tgactctgcc catttctcta ggacgctaga aggtagagcc 60
ctggttttct gttaggcacc tctgtgtctc tttctaggag ggaagtggcc ctgacagggg 120
tcctcctttg actcagccca catcccagaa tgctggagga ctgagtccag gtttctggca 180
gaccagtcan nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnntg ttcaagtttc 240
ttgaagaatc tccaagaaag aaaaaaaaaac tgttataaac tctttgtgaa taatgaatga 300
atgagtgagg acaagggctt gcgcttgctc tccactttgt agctccacgg cgaaagctac 360
ggagttcaag taggcctca cctgcggttc cgtggcgacc tcataaggct taaggcagca 420
tcaggcatag ctcgatctga gccggaagtt tataccgg 458

<210> 457

<211> 481

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously
y

<400> 457

agggggaggg gtggaggcac ggcaggctcc cggtggcagg atggcctgag aagggccagg 60
atgaggcagg gtggctggcg ctgccccaga tgaagggtgt tgaggcacac accatactcc 120
aaacggaggt gccccacagc agagcccaag cagctaagtc ggggaaaggg cagtgggcga 180
ggtcagaaag ctgggtcatg caggccaagt cacttccct ctgcatctca gaggtccagg 240
gttagaaca aggtttgagt ggctttggca agcagtggct gttaactcac nnnnnnnnnn 300
nnnnnnnnnn nnnnnnnnnn nnnnnnnnng tgggtgagcc ctaccaagct gacctgcaga 360
aggggagata gacactaaac acataaatga gcaattatth atgacagtgc ccagcacaca 420
gaaaacaaca aagtaggccc ctctgcggag gtgacatttc ataacaacag cagctcgctg 480
a 481

<210> 458

<211> 500

<212> DNA

<213> Homo sapiens

<400> 458

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gggagctttg agaagaaaaa tctgtttaag tgaactactc tggctatata tacatatgga      60
ggtttgaaga gtttgcctct gagcattttc ataattgaat ccttttgaga aagtttcata      120
catcacacat ttaccgtgtg agatttggtg agtataaata tccaagatg tatttgaagc      180
tttcttaatt tggtttgaaa aaattagact aatctcatgg ctccaaaaa agaaagtcca      240
cactatccca tcaattaata gatttaattt ttgataaatt ttggtaaagtg gtgctgttat      300
tactggttct agtatgttac ctagtaccta gttggttttt tgttggtttg ttttacgtat      360
tttcatgcac tacaccaata agttgcacca atagttgctg tcttcttatt atagggagaa      420
ggaaagcaga gtgttactgt tacaaactca gatgtgaatt gttgaatcaa atttgacata      480
cttaactcga tgaaaatttt                                     500
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<210> 459

<211> 500

<212> DNA

<213> Homo sapiens

<400> 459

```
tgcagttggt ggcatttgac ttcctgagac tgctgccacc aactacactc atgccctcac      60
agtacgcgac gaagctatag tttggaactc ttactaatgt ctataaagcc agtatgatag      120
caatgatggc aggatcagat tttattaaga cctctactgg aaaagaaaca gttaatgcca      180
ccttccagaa catagtaata taccgccatt aagatttctt ctgaaaactg gaaacaagat      240
agttaaacca tcagagcatc ccagtgcaaa gattccttgt tgctctatat tccaaccgga      300
gcttggagat gagtggctga agccagaact ctttcgaata ggtgccagta ctctgctctc      360
ggacattgag aggtaaattt accatcatgt cactggaaag atatccccct ccatcattat      420
ccctatctat gttaaaatca cccccaatcc ctataaaact ctttacaatt cgagtcaaaa      480
ttatttttct acgtaattgc                                     500
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<210> 460

<211> 499

<212> DNA

<213> Homo sapiens

<400> 460

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ccgcacaatc agggcagaca gaactcagtg gttgttactt acccaatctg attataaaaa      180
aattggaacc aggagaccca gagattatag caagttgatt ttttaaaaaa tttatctcaa      240
actggtgcca ttgcaaacco aagcattttg agtgccaaaa cctgggtaaa cagagaaagc      300
tggttaacgg acagagaaaa agaaagtggg catgttttac gtcaatttcc ctggaagcag      360
aacctgagat ggggattccc tcaggggaaa cctgcagcgt gctgaggagag gtggagagtg      420
cacacaggta gctgggcaaa gaggtggttt ctgctgagcc ttcaccctgg tctcatgggg      480
agctcccggg atgaatggc                                     499
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<210> 461

<211> 642

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously

<400> 461

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ggggatcaaa atacaagcat attatcgtaa caaaatatc ttttgggaaa attttgaatt      60
aagaaaaggg agcctctttg actctaattc tggtaggtag tctatcgatt atgtgtgaac      120
tattttaact aaaatgcaac ttannnnnnn nnnnnnnnnn nnaatatatt tatgaaacat      180
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agcagaatta ccaaaaaaag attgtcaatt ttcctaagtt aaatgtaagg atgcaaattgt 240
tctaataattg aggggagata aaattcaaaa ccattgggac ttgcttctt tatccatcac 300
tttgggtagc tgaacaccta acctggtaaa ttgaatgttt ttcattggagg cttatcagca 360
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tagccagttt ctcatccagg gtgtcattgt ttctaataac aattcagaat ctggctgctt 480
aaaggcacct aggtacgtgg ttctttctaa tttgtcaagg catttggagt gatcctatca 540
ccctgatttc aagcaaaaga caggaggga cctgacccaa aggctgctg tctgaacaca 600
ctctgaatgg gtgagcagag atgtgcttta agatagaacc ta 642

<210> 462

<211> 609

<212> DNA

<213> Homo sapiens

<400> 462

ggggaagcgg cagggccacc aaccacgaca gctgcgatag ctgcaaggaa ggtggagatc 60
tcctgtgctg cgaccactgc ccggctgcct tccacctcca gtgctgtaac cctccactga 120
gtgaagaaat gttgcctcct ggagagtggg tgtgtcaccg gtgcaactgtt cgccgaaagg 180
taataatgct gctttctgaa gactgtccag aaagcctgat ccagagcact gatatgctag 240
agctaagacg gcctagccct gaaggcattc ttgtcccttc ttcttgtctc ttccagccct 300
ggaatcacc cactcttccc atggtgactg tttggaatcc agtagggcct aaaaatccaa 360
acatgggctg ctgaaatggg cagaagaggt gtgttaactt actgagccat gtttagtcac 420
tagtgacagg agtagtctta ccttcttggt gtctccttaa taagtggcct tatccatggc 480
tgaaaaacaa aggctgcttc tccagcttga tggaaaatgg agttttctct caccacaggg 540
caaataagtc actggtatcc agagacttgg catactgacg gagaggattt tgaacgcatt 600
tgtacccca 609

<210> 463

<211> 723

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> ()..()

<223> "n" is a single nucleotide whose identity could not unambiguously
y

<400> 463

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agtcctgagc acgtgtggct tgtgttttag ccagatcgct ctggcttcgg tgtggaaggg     180
ggcacaggct gaggcaggga gcatctggag gacttcgta caagagccaa gggagagaag      240
atgctggctt ggaccagggc gggcagggga ggtgataaga ggcgnnnnnn nnnnnnnnnn     300
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnngg ggcacacaag tgaggattca     360
aggcaacacc aaggctggtt gcccgactgg accagtgggtg cttgccccta attgagatgg     420
ggaagacaac aggaaagctg acttgggaga caccagcagg agctgagctc tgagcatgtt     480
caatttcgga tgagcctcag ggtcaagggc acggcttagg gcagaatccc gggcaatcca     540
gtaccttttc tttcagagat ggagaaaaga cagagggcac aggaaagtca gaaggaaacc     600
aaaatcagtg ggaaataatt tgcaaaagga aggtgggcaa gctgaagaga cagagaccac     660
tagcttagta actggcccct tccagaaaag gaccacacta gtgagcgggt gagcctggcc     720
gcc                                                                    723
```

<210> 464

<211> 414

<212> DNA

<213> Homo sapiens

<400> 464

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gggaaataga acttgagttt aaacctaata tgtaccatgc ttttgagaga gaacagcgga      60
gaaagcgttg ctcttcactc taagagggaac acgctagcaa atgcaaggag ttgaaaattc     120
aggcagcatg tttaagagtt aagtatagat ctttttgat acagcagaga tcttaaattgt     180
caggattaca ttttgacttc tagagtaaaa atttttagca catatggact cacagagact     240
```

tcactcaaaa caatcttact gagcagctga acttacaaaa taaatacaag cagaagtttt 300
tttagttata ctgtaaaaag ggaccactcc ctggcagtta ccctgagaaa aaattcaatg 360
gttccacata atctaaaggc atgatgttgt tgtccttttt ttttttttta agaa 414

<210> 465

<211> 545

<212> DNA

<213> Homo sapiens

<400> 465

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agcagaatct tgcaggaggt accagagctt attgagtaga caagagggag aaccacagac 120
agagagaaga gcaacatgtg atggcccaca cgcgggaaag aagcatggag ccaccaggcg 180
aggttcttac aaatgaaaag aaaatggtga tgtgtattgt aaacagagag gtgctttttc 240
aatccaaggc atcgcacctt tatttcaaaa ctacttacgc tacataatcc tgctcatctt 300
ctgcctgaaa gtgatatgtt ctattatcta aaataaaaaa aaagaaaaat aagtgaacc 360
ttagaaagca gggtaacttc aggtacaaca cagatttaag ttcctgggaa gaaaaccagt 420
aaaagtagaa ttttaatat atttttagttt tacgccatta tgtgccaggt gccttgtgta 480
cattattgct aatcttcaca aaagctctat ctgtttctca tatttttaca gaaaaaaaaa 540
ctgag 545

<210> 466

<211> 719

<212> DNA

<213> Homo sapiens

<400> 466

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cctaacctct tctccctctg gattcctgag aaccttcct tctttctggt tctgtgggcc 180
gtcggatcct tctgttctcc cctgcccccc accgcagcc tgcaacgaca cagttacctc 240
agaactgaaa tattcctgga aacaccggcc tcgtctgggt aatttcatga gccgtttttt 300
tctgccaga tgacttagtt cttgtctatc caaaggcttc tccccctgct gtccctgtgt 360

agggagctga tctcccctag ggatgtccca cagggctcag aatgggagag ggtaagttct	420
gagctggggtt cctgactgta cctcttggcc atgacaaagg cagagcctag aactccggcc	480
agcatgtggg taaagaagga agcctagctc ccagctccgg cttcagttgg gacccttggt	540
ctcgccacta actttgagtg aagccagact cgatgctgaa agcgacctca aggctgggag	600
ggccgctgcc caattcagca ggtctccaat ctccaaaact aatgctactc tgtaccata	660
ggatcctaga ggtgactgcc agatccctag gcttggagtt gtgttgagat gtgaggagc	719